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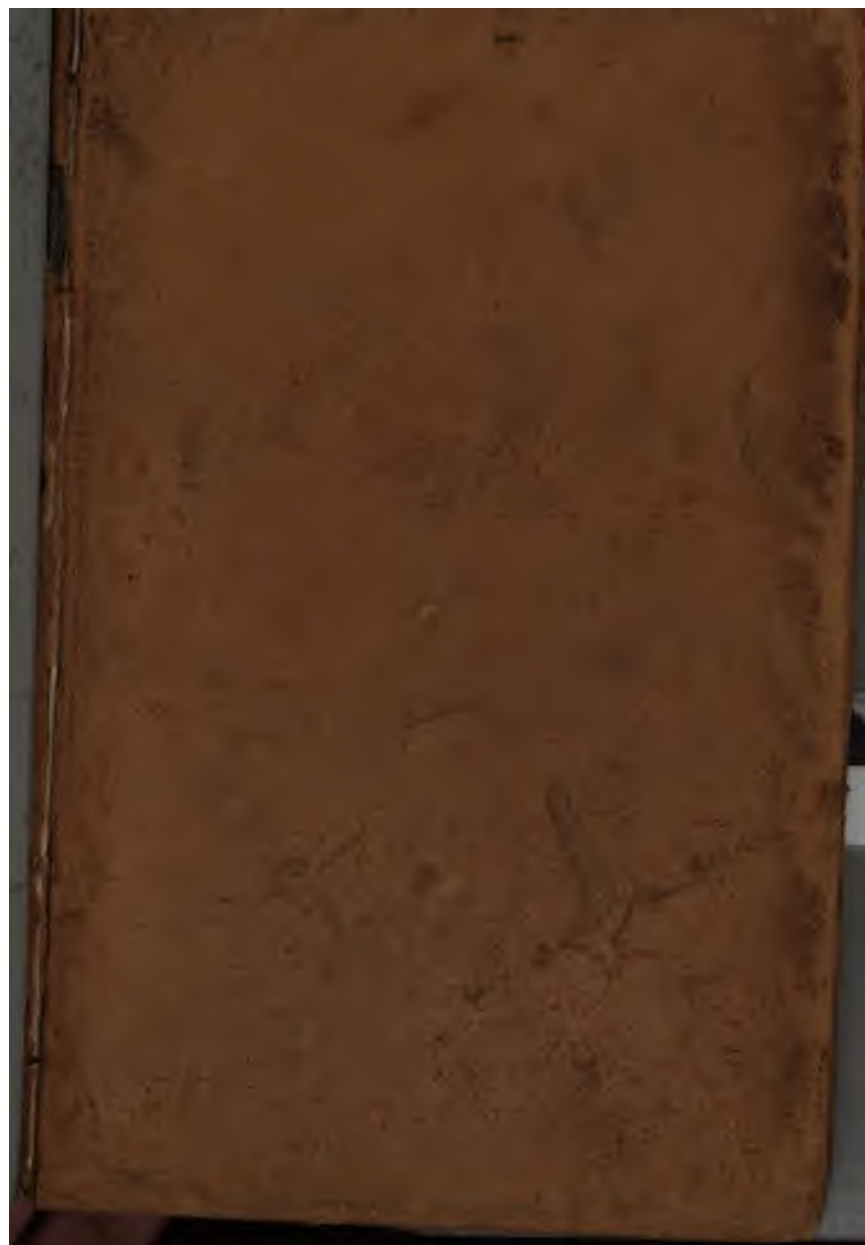
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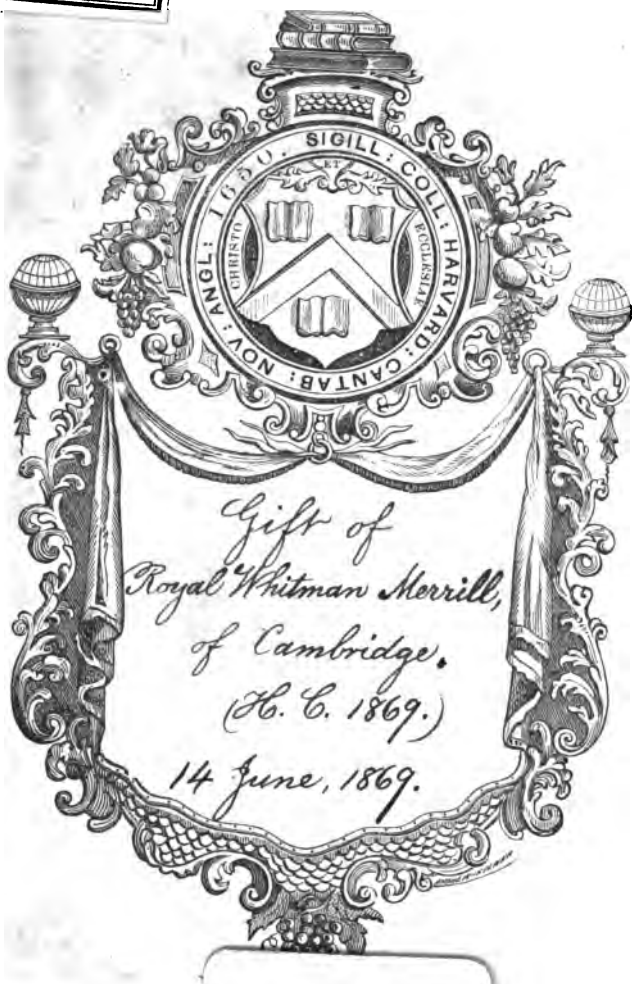
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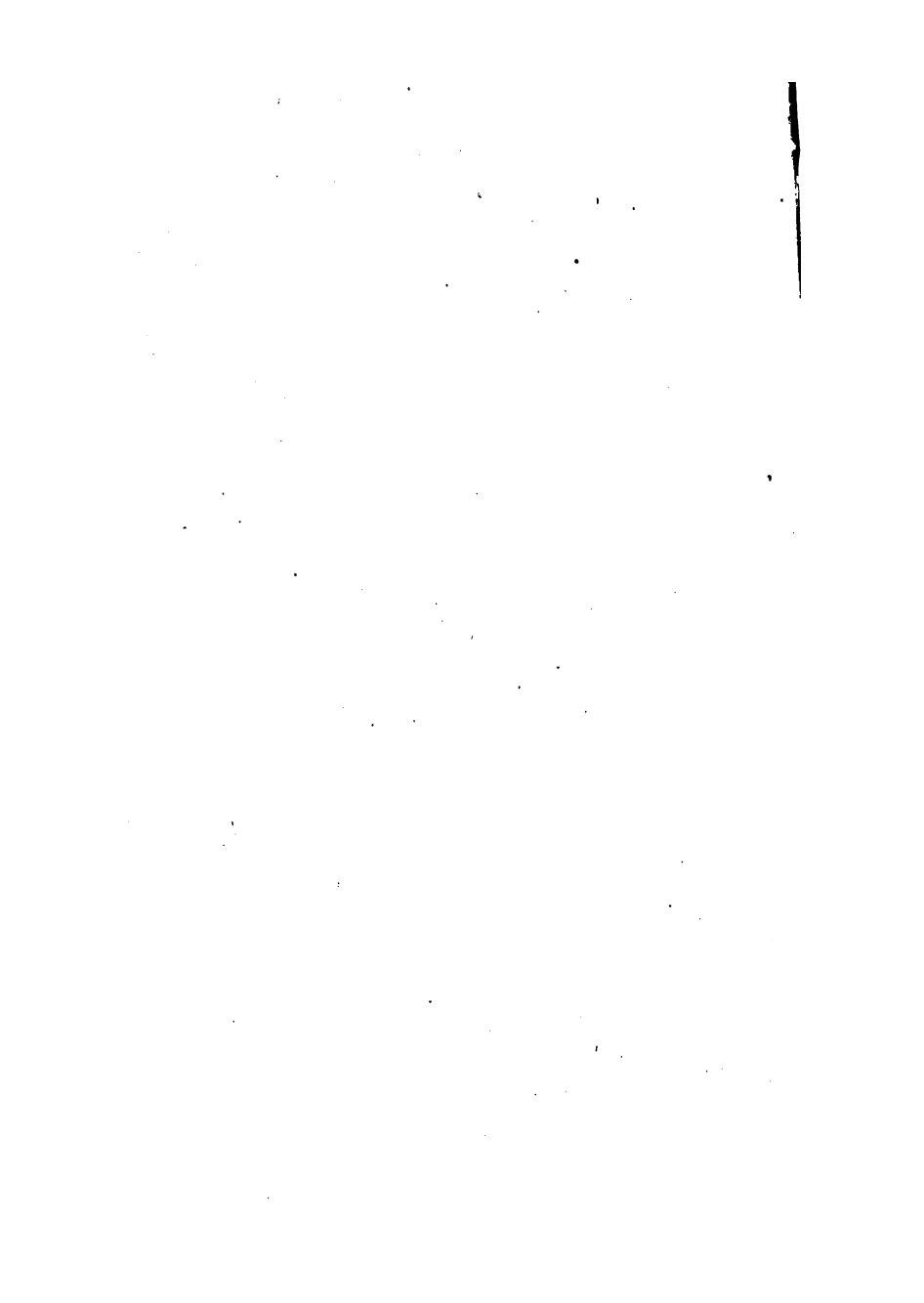


27118.
O. 796





3 2044 096 995 394



A
© **COMPLETE KEY**
TO
SMILEY'S
NEW FEDERAL CALCULATOR,
OR
Scholar's Assistant;
IN WHICH THE
METHOD OF SOLVING ALL THE QUESTIONS CONTAINED
IN THAT WORK IS EXHIBITED AT LARGE.

DESIGNED
TO FACILITATE THE LABOUR OF TEACHERS, AND ASSIST
THOSE WHO HAVE NOT THE ADVANTAGE OF A
TUTOR'S AID.

BY THOMAS T. SMILEY,

Author of an Easy Introduction to the Study of Geography. Also,
of Sacred Geography, for the use of Schools.

PHILADELPHIA:
LIPPINCOTT, GRAMBO, & CO.
SUCCESSORS TO
GRIGG, ELLIOT & CO.,
No. 14, NORTH FOURTH ST.
1850.

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✓
1869, June 14.
Gift of
Royal Whitman Merrill,
of Cambridge.
(H. C. 1869.)

Entered, according to the Act of Congress, in the year 1846, by

JOHN GRIGG,

in the clerk's office of the District Court of the Eastern District
of Pennsylvania.

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EXPLANATION OF CHARACTERS.

Signs.	Significations.
=	Equal; as 20s.=£1.
+	Addition, (or more) as $6+2=8$.
—	Subtraction, (or less) as $8-2=6$.
×	Multiplication, (or multiplied. by) as $6\times 2=12$.
÷	Division, (or divided by) as $6\div 2=3$.
:::	Proportionally; as $2:4::6:12$.
√ or √	Square Root: as $\sqrt{64}=8$.
∛	Cube Root; as $\sqrt[3]{64}=4$.
—	A vinculum; denoting the several quantities over which it is drawn, to be considered jointly as a simple quantity.

A KEY

TO

The New Federal Calculator.



SIMPLE ADDITION.

EXAMPLES.

(8)	4829 1234 6101 3014 5618 <hr/> 20796	(9)	91769 14678 80032 71897 76989 <hr/> 335365	(10)	876994 213678 482906 809769 376980 <hr/> 2760327
(11)	389261 789794 849798 487697 999996 948219 <hr/> 4464765	(12)	2136784 8297698 8297694 4897695 1234697 7092032 <hr/> 31956600	(13)	3769694 4976082 4569761 8213243 4876962 4876920 <hr/> 31282662
(14)	37856 975 1234 14 5612 2075 16287 <hr/> 64053	(15)	378269 402607 702 1246 2132 45178 10276 <hr/> 840410	(16)	141 5672 82971 34676 1459 427 12 <hr/> 125358

SIMPLE ADDITION.

(17) 14	(18) 36	(19) 3797	(20) 205
16	97	95	20
23	125	2	840
29	384	75	970
80	1176	876	367
31	<u> </u>	9750	1001
100	1818	<u> </u>	<u> </u>
<u> </u>	<u> </u>	14595	3403
293		<u> </u>	<u> </u>

(21) 365	(22) 300	(23) 75960806
807	75	225000
560	2	140
25	47	<u> </u>
37	33	76185940
101	9784	<u> </u>
<u> </u>	20150	
1895	765091	
<u> </u>	1075047	
	<u> </u>	
	1870529	

PRACTICAL EXERCISES.

(24) 35	(25) 275	(26) 30	(27) 50	(28) 37
21	196	12	25	33
<u> </u>	<u> </u>	5	125	40
56	471	<u> </u>	216	35
<u> </u>	<u> </u>	\$47	<u> </u>	<u> </u>
		<u> </u>	416	145

<i>Sheep.</i>			<i>bar.</i>	<i>\$</i>
(29) A's 34	(30) 25	(31) 8	(32) 400 for	2000
B's 47	15	15	550	2750
C's 54	40	19	<u> </u>	<u> </u>
<u> </u>	9	12	950	\$4750
135	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	89	54		
	<u> </u>	<u> </u>		

MULTIPLICATION.

CASE I

EXAMPLES.

(8) 3948769768 3	(9) 87051298 4	(10) 976201698769 5
<u>11846309304</u>	<u>348205192</u>	<u>4881008493845</u>

(11) 456978426976 6	(12) 8079698769 7	(13) 97698429769 8
<u>2741870561856</u>	<u>56560691383</u>	<u>781587438152</u>

(14) 28769842369 9	(15) 769829769478 10
<u>258928581321</u>	<u>7698297694780</u>

(16) 5697698976845 11	(17) 7029876956 12
<u>62674688745295</u>	<u>84358523472</u>

(18) 84976876969 12	(19) 9021681409671 12
<u>1019722523868</u>	<u>108260176916052</u>

(20) 4218 2	(21) 7321 3	(22) 87692 4	(23) 95698 5
<u>8436</u>	<u>21963</u>	<u>350768</u>	<u>478490</u>

(24) 10691 6	(25) 31078 7	(26) 109019 8	(27) 900078 9
<u>64146</u>	<u>217546</u>	<u>872152</u>	<u>8100702</u>

8

MULTIPLICATION.

$$\begin{array}{r} (28) \quad 826870 \\ \quad \quad 10 \\ \hline 8268700 \end{array}$$

$$\begin{array}{r} (29) \quad 278976 \\ \quad \quad 11 \\ \hline 3068736 \end{array}$$

$$\begin{array}{r} (30) \quad 12569769 \\ \quad \quad 12 \\ \hline 150837228 \end{array}$$

CASE 2.

EXAMPLES.

$$\begin{array}{r} (34) \quad 39786948 \\ \quad \quad 197 \\ \hline 278508636 \\ 358082532 \\ 39786948 \\ \hline 7838028756 \end{array}$$

$$\begin{array}{r} (35) \quad 4978829 \\ \quad \quad 408 \\ \hline 39830632 \\ 19915316 \\ \hline 2031362232 \end{array}$$

$$\begin{array}{r} (36) \quad 8735698 \\ \quad \quad 5706 \\ \hline 52414188 \\ 61149886 \\ 43678490 \\ \hline 49845892788 \end{array}$$

$$\begin{array}{r} (37) \quad 84016978 \\ \quad \quad 3761 \\ \hline 84016978 \\ 504101868 \\ 588118846 \\ 252050934 \\ \hline 315987854258 \end{array}$$

$$\begin{array}{r} (38) \quad 49569876 \\ \quad \quad 4817 \\ \hline 346989132 \\ 49569876 \\ 396559008 \\ 198279504 \\ \hline 238778092692 \end{array}$$

$$\begin{array}{r} (39) \quad 9637842 \\ \quad \quad 9078 \\ \hline 77102736 \\ 67464894 \\ 86740578 \\ \hline 87492329676 \end{array}$$

$$\begin{array}{r} (40) \quad 9786 \\ \quad \quad 13 \\ \hline 29358 \\ 9786 \\ \hline 127218 \end{array}$$

$$\begin{array}{r} (41) \quad 8476 \\ \quad \quad 29 \\ \hline 76276 \\ 16950 \\ \hline 245775 \end{array}$$

$$\begin{array}{r} (42) \quad 11271 \\ \quad \quad 35 \\ \hline 56355 \\ 33813 \\ \hline 394485 \end{array}$$

MULTIPLICATION.

9

$$\begin{array}{r} (43) \quad 19004 \\ \quad \quad 305 \\ \hline \quad 95020 \\ 57012 \\ \hline 5796220 \\ \hline \end{array}$$

$$\begin{array}{r} (44) \quad 76976 \\ \quad \quad 489 \\ \hline \quad 692784 \\ \quad 615808 \\ 307904 \\ \hline 37641264 \\ \hline \end{array}$$

$$\begin{array}{r} (45) \quad 84789 \\ \quad \quad 976 \\ \hline \quad 508614 \\ \quad 593383 \\ 762921 \\ \hline 82734544 \\ \hline \end{array}$$

$$\begin{array}{r} (46) \quad 1978987 \\ \quad \quad 4809 \\ \hline \quad 17810883 \\ 15831896 \\ 7915948 \\ \hline 9516948483 \\ \hline \end{array}$$

$$\begin{array}{r} (47) \quad 9807094 \\ \quad \quad 5047 \\ \hline \quad 68649658 \\ \quad 39228376 \\ 49035470 \\ \hline 49496403418 \\ \hline \end{array}$$

CASE 3.

EXAMPLES.

$$\begin{array}{r} (48) \quad 37|00 \\ \quad \quad 2|00 \\ \hline \quad 740000 \\ \hline \end{array}$$

$$\begin{array}{r} (49) \quad 4870 \\ \quad \quad 25|00 \\ \hline \quad 24350 \\ \quad 9740 \\ \hline 12175000 \\ \hline \end{array}$$

$$\begin{array}{r} (50) \quad 4087|00 \\ \quad \quad 906|000 \\ \hline \quad 24522 \\ \quad 36783 \\ \hline 370282200000 \\ \hline \end{array}$$

$$\begin{array}{r} (51) \quad 876956 \\ \quad \quad 99|0000 \\ \hline \quad 7892604 \\ \quad 7892604 \\ \hline 868186440000 \\ \hline \end{array}$$

SUBTRACTION.

CASE 4.

EXAMPLES.

(53) 8976 6 53856 8 430848	(54) 7696 9 69264 9 623376	(55) 87698 9 789282 8 6314256	(56) 20784 12 249408 9 2244672
(57) 81207 11 893277 12 10719324	(58) 47696 12 572352 12 6868224	(59) 75687 7 529809 8 4238472	(60) 34075 6 204450 6 1226700

PRACTICAL EXERCISES.

(61) \$25 5 \$125	(62) 15 4 60	(63) \$250 7 \$1750	(64) \$150 4 \$600
(65) \$100 25 500 200 \$2500	Or thus, 100 5 500 5 \$2500	66) 18175 14 72700 18175 254450	

SUBTRACTION.

EXAMPLES.

(4) 859768 124978 734790	(5) 9076048 7940689 1135359	(6) 532147878 139876956 392270922
--------------------------------	-----------------------------------	---

DIVISION.

11

(7) 100000 84321 <hr/> 15679	(8) 75381478 39040217 <hr/> 36341261	(9) 102070845 19768799 <hr/> 82302046		
(10) 196 37 <hr/> 159	(11) 487 96 <hr/> 391	(12) 875 302 <hr/> 573	(13) 967 351 <hr/> 616	(14) 1001 487 <hr/> 514
(15) 9765 1307 <hr/> 8458	(16) 87696 10091 <hr/> 77605	(17) 455692 300120 <hr/> 155572	(18) 1000000 1 <hr/> 999999	

PRACTICAL EXERCISES.

(19) 25 8 <hr/> 17	(20) 75 42 <hr/> 33	(21) 7896 4389 <hr/> 3507	(22) 4875 2976 <hr/> 1899	(23) 1240 1082 <hr/> 140	375 567 <hr/> 140 Sum 1082
(24) 5487 2075 <hr/> 3412	325 750 <hr/> 1000 2075 Sum.		(25) 25 containing 250 9 <hr/> 16		75 <hr/> 175

DIVISION.

EXAMPLES OF SHORT DIVISION.

(7) 2)56789768 <hr/> 28394884	(8) 3)3729768769 <hr/> 1243256256+1	(9) 4)469769676 <hr/> 117442469
----------------------------------	--	------------------------------------

12

DIVISION.

$$\begin{array}{r} (10) \quad 5) 849768769 \\ \underline{169953753} + 4 \end{array}$$

$$\begin{array}{r} (11) \quad 6) 756976874 \\ \underline{126162812} + 2 \end{array}$$

$$\begin{array}{r} (12) \quad 7) 87694213628 \\ \underline{12527744804} \end{array}$$

$$\begin{array}{r} (13) \quad 8) 80269687 \\ \underline{10033710} + 7 \end{array}$$

$$\begin{array}{r} (14) \quad 9) 376948769 \\ \underline{41883196} + 5 \end{array}$$

$$\begin{array}{r} (15) \quad 11) 876956788 \\ \underline{79723344} + 4 \end{array}$$

$$\begin{array}{r} (16) \quad 12) 4976876946782 \\ \underline{414739745565} + 2 \end{array}$$

$$\begin{array}{r} (17) \quad 12) 89769762048769 \\ \underline{7480813504064} + 1 \end{array}$$

$$\begin{array}{r} (18) \quad 2) 3976 \\ \underline{7988} \end{array}$$

$$\begin{array}{r} (19) \quad 3) 8769 \\ \underline{2923} \end{array}$$

$$\begin{array}{r} (20) \quad 4) 47876 \\ \underline{11969} \end{array}$$

$$\begin{array}{r} (21) \quad 5) 8767 \\ \underline{1753} + 2 \end{array}$$

$$\begin{array}{r} (22) \quad 6) 9698 \\ \underline{1616} + 2 \end{array}$$

$$\begin{array}{r} (23) \quad 7) 97899 \\ \underline{13985} + 4 \end{array}$$

$$\begin{array}{r} (24) \quad 8) 80409 \\ \underline{10051} + 1 \end{array}$$

$$\begin{array}{r} (25) \quad 9) 981021 \\ \underline{109002} + 3 \end{array}$$

$$\begin{array}{r} (26) \quad 10) 897697 \\ \underline{89769} + 7 \end{array}$$

$$\begin{array}{r} (27) \quad 11) 9876978 \\ \underline{897907} + 1 \end{array}$$

$$\begin{array}{r} (28) \quad 12) 4967844 \\ \underline{413987} \end{array}$$

PRACTICAL EXERCISES.

$$\begin{array}{r} (29) \quad 2) 12 \\ \underline{6} \end{array}$$

$$\begin{array}{r} (30) \quad 7) 350 \\ \underline{50} \end{array}$$

$$\begin{array}{r} (31) \quad 8) 8736 \\ \underline{4) 1092} \\ \underline{273} \end{array}$$

$$\begin{array}{r} (32) \quad 3) 3966 \\ \underline{1322} \end{array}$$

LONG DIVISION.

EXAMPLES.

$$\begin{array}{r}
 (35) \quad 13 \overline{)875(67} \\
 \underline{78} \\
 95 \\
 \underline{91} \\
 4
 \end{array}$$

$$\begin{array}{r}
 (36) \quad 15 \overline{)476(31} \\
 \underline{45} \\
 26 \\
 \underline{15} \\
 11
 \end{array}$$

$$\begin{array}{r}
 (37) \quad 18 \overline{)958(53} \\
 \underline{90} \\
 58 \\
 \underline{54} \\
 4
 \end{array}$$

$$\begin{array}{r}
 (38) \quad 28 \overline{)1475(52} \\
 \underline{140} \\
 75 \\
 \underline{56} \\
 19
 \end{array}$$

$$\begin{array}{r}
 (39) \quad 31 \overline{)4277(137} \\
 \underline{31} \\
 117 \\
 \underline{93} \\
 247 \\
 \underline{217} \\
 30
 \end{array}$$

$$\begin{array}{r}
 (40) \quad 37 \overline{)25757(696} \\
 \underline{222} \\
 355 \\
 \underline{333} \\
 227 \\
 \underline{222} \\
 5
 \end{array}$$

$$\begin{array}{r}
 (41) \quad 41 \overline{)256976(6267} \\
 \underline{246} \\
 109 \\
 \underline{82} \\
 277 \\
 \underline{246} \\
 316 \\
 \underline{287} \\
 29
 \end{array}$$

$$\begin{array}{r}
 (42) \quad 48 \overline{)337979(7041} \\
 \underline{336} \\
 197 \\
 \underline{192} \\
 59 \\
 \underline{48} \\
 11
 \end{array}$$

14

LONG DIVISION.

(43) 59)997816(16912

(44) 98)999987695(10203956

5998

407

199354

196

538

387531294

71

93659882

126

54911849085955887

(45) 125)4697680424(37581443

(46) 396)387690204986(979015668

3753564

947

31298752772

726

35706253564

1018

6201000396

180

22441251980

554

26485002376

542

27285002376

424

3526375316849358

LONG DIVISION.

15

(47) 87648760000487695568232932

(48) 147887688800004095833576454

43807390

4960

137984380

13302

58024962

5256

4434

54605288

5256

4434

20408520

1752

7390

288411300

2628

10346

25689540

1752

8868

81676724

7884

5912

28368120

2628

7390

20897302

1752

5912

3371390

LONG DIVISION.

(49) 8769698769768730497(1198274501 (50) 97680|00008976478976|0009031896

87696

87912

11073718527

87696

9768230416875981753927814455024894549526176879122407276637717539258608653352776966138723948003507844401644384801684978769680801

(51) 1476980|00000)4789768214|00000(3242 Ans.

4430940358828229539606343221590792043530142953960Rem. 1399054

LONG DIVISION.

17

PRACTICAL EXERCISES.

(52) 45)9847(218
90

84

45

397

360

Rem. 37

(53) 391)1259678(3221
1173

866

782

847

782

658

391

Rem. 267

(54) 148)225476(1523
148

774

740

347

296

516

444

Rem. 72

(55) 25)375(15 bushels.
25

125

125

$$(56) \quad 75 \overline{) 87735825} (1169811$$

$$\begin{array}{r}
 75 \\
 \hline
 127 \\
 75 \\
 \hline
 523 \\
 450 \\
 \hline
 735 \\
 675 \\
 \hline
 608 \\
 600 \\
 \hline
 82 \\
 75 \\
 \hline
 75 \\
 75 \\
 \hline
 \hline
 \end{array}$$

$$(57) \quad 49850 \overline{) 99700} (2$$

$$99700$$

When the divisor is the exact product of any two figures multiplied together.

EXAMPLES.

$$(61) \quad 5 \overline{) 9756}$$

$$7 \overline{) 1951} + 1 \text{ 1st Rem.}$$

$$278 + 5 \text{ 2d Rem.}$$

$$\times 5$$

$$25 + 1 = 26$$

$$(62) \quad 9 \overline{) 8491}$$

$$9 \overline{) 943} + 4$$

$$104 + 7 \times 9 + 4 = 67$$

$$(63) \quad 9 \overline{) 44767}$$

$$2 \overline{) 4974} + 1 \text{ Rem.}$$

$$2487$$

$$(64) \quad 7 \overline{) 92017}$$

$$8 \overline{) 13145} + 2$$

Rem.

$$1643 + 1 \times 7 + 2 = 9$$

LONG DIVISION.

19

(65) $11 \overline{)55210}$

$9 \overline{)5019} + 1$

Rem.
 $557 + 6 \times 11 + 1 = 67$

(66) $6 \overline{)38751}$

$8 \overline{)6458} + 3$

Rem.
 $807 + 2 \times 6 + 3 = 15$

(67) $12 \overline{)99876}$

$9 \overline{)8323}$

Rem.
 $924 + 7 \times 12 = 84$

(68) $12 \overline{)37967}$

$12 \overline{)3163} + 11$

Rem.
 $263 + 7 \times 12 + 11 = 95$

PRACTICAL EXERCISES.

(69) $5 \overline{)3775}$

$5 \overline{)755}$

Ans. 151

(70) $12 \overline{)480}$

$8 \overline{)40}$

Ans. 5 $\frac{1}{2}$

(71) $12 \overline{)14400}$

$12 \overline{)1200}$

Ans. 100

(72) $12 \overline{)1800}$

$6 \overline{)150}$

Ans. 25

(73) $12 \overline{)396}$

$11 \overline{)33}$

Ans. $\frac{1}{2}$

EXAMPLES IN ADDITION, MULTIPLICATION, SUBTRACTION
AND DIVISION.

(1) 50

50

100

-25

75 Ans.

(2) $40 \ 10$

$20 \ 10$

$2 \overline{)20} \ 20$

Ans. 10

(3) 25000

13000

$2 \overline{)12000}$

$\$6000$

20

COMPOUND ADDITION.

(4) Bought 8200 Sold 3756 (5) 50)2450(49 miles. Ans.
 5000 4879 200

13200 8635 450
 8635 — 450

Ans. 4565

(6) Bought 24 bags, containing 3000 lb
 Sold 15 1736

Remains 9 bags, containing 1264 lb

(7) Days 365)2920(8 dols. per day. Yearly income 2920
 2920 Spends yearly 1769

Saves per year \$1151

COMPOUND ADDITION.

FEDERAL MONEY.

EXAMPLES.

(2) \$ cts. m.
 48 75 5
 79 37 8
 43 50 0
 97 37 5

 \$267 00 8

(3) \$ cts.
 37 68½
 95 37½
 43 25
 79 56½

 \$255 87½

(4) \$ cts.
 72 62½
 85 87½
 20 12½
 45 18½
 94 37½
 42 68½
 79 18½

\$440 06½

COMPOUND ADDITION.

21

	\$	cts.
(5)	54	75
	37	37½
	93	18½
	149	87½
	503	68½
	979	12½
	2194	18½
	<hr/>	
	\$4012	18½

	\$	cts.
(6)	29	25
	34	37½
	188	68½
	265	12½
	1783	18½
	8579	56½
	6	87½
	<hr/>	
	\$10887	06½

	\$	cts.
(7)	1	18½
	2	50
		87½
		93½
	1	87½
	2	68½
		37½
		87½
	1	93½

\$13 25

	\$	cts.
(8)	15	00
	18	50
	8	87½
	1	18½
	14	50
	0	87½
	5	37½
	7	87½
	20	00
	<hr/>	
	\$82	18½

	\$	cts.
(9)	1	87½
	1	68½
	0	43½
	1	37½
	0	93½
	0	56½
	0	37½
	0	31½
	0	12½
	<hr/>	
	\$7	68½

STERLING MONEY.

EXAMPLES.

	£	s.	d.
(2)	7	9	4½
	13	7	6½
	4	5	2
	10	18	10½
	<hr/>		
Ans.	36	1	0

	£	s.	d.
(3)	4	6	4
	47	19	7
	159	5	3
	78	6	11½
	<hr/>		
Ans.	289	18	1½

	£	s.	d.
(4)	565	3	7
	382	13	5
	592	9	2
	856	17	3
	259	9	8
	<hr/>		
Ans.	2656	13	1

	£	s.	d.		£	s.	d.		£	s.	d.
(5)	142	16	7	(6)	763	7	4	(7)	69	18	7
	489	3	4		39	4	9		175	2	6
	726	15	9		162	17	8		1582	19	4
	573	4	8		459	15	0		175	13	8
	628	12	6		473	12	8		143	13	8
<hr/>				<hr/>				<hr/>			
Ans.	2560	12	10	Ans.	1898	16	11	Ans.	2359	8	1
<hr/>				<hr/>				<hr/>			

	£	s.	d.		£	s.	d.
(8)	1776	12	8	(9)	985	4	9
	412	16	5		186	13	4
	369	7	2		1569	18	4
	469	15	10		183	0	8
	573	19	2		0	17	4
	1987	14	8		0	6	7
	4823	15	11				
	<hr/>				<hr/>		
Ans.	10414	1	10	Ans.	2925	15	0

AVOIRDUPOIS WEIGHT.

	<i>T. cwt. qr. lb. oz. dr.</i>		<i>T. cwt. qr. lbs. oz. dr.</i>
(2)	7 11 2 16 4 13	(3)	12 16 1 19 15 0
	15 7 3 8 16 7		114 10 2 12 4 15
	138 19 1 12 8 13		72 4 2 24 14 5
	42 8 3 19 12 4		176 15 3 4 15 11
	357 6 2 8 3 3		
Ans.	561 14 1 7 13 8	Ans.	376 7 2 6 1 11

	<i>T.</i>	<i>cwt.</i>	<i>gr.</i>	<i>lb.</i>	<i>oz.</i>	<i>dr.</i>
(4)	139	19	3	18	13	10
	1754	10	2	11	2	14
	27	3	0	14	11	0
	0	13	0	0	13	0
Ans.	1922	6	2	17	8	8

COMPOUND ADDITION.

23

TROY WEIGHT.

<i>lbs. oz. dwts. gr.</i>	<i>lbs. oz. dwts. gr.</i>	<i>lbs. oz. dwts. gr.</i>
(2) 185 2 19 20	(3) 16 4 18 6	(4) 172 11 19 22
56 2 15 6	7 9 11 22	12 4 13 12
1472 11 2 17	163 7 12 18	18 5 11 20
385 0 8 5	17 0 13 0	119 11 13 18
10 8 7 12		0 0 2 13
	Ans. 204 10 15 22	0 10 0 20
Ans. 2110 8 13 12		
		Ans. 324 8 2 9

APOTHECARIES' WEIGHT.

<i>℥s. ʒs. ʒs. gr.</i>	<i>℥s. ʒs. ʒs. gr.</i>	<i>℥s. ʒs. ʒs. gr.</i>
(2) 84 7 6 0 12	(3) 18 0 1 0 12	(4) 182 3 1 0 0
132 5 0 2 0	175 10 5 0 10	12 1 0 2 17
16 2 2 2 8	472 3 1 2 3	17 2 4 2 15
1427 6 7 0 19	0 11 7 2 0	0 10 2 1 19
14 0 6 1 9		
	Ans. 667 1 7 2	5 Ans. 212 5 1 1 11
A. 1674 10 7 1 8		

LONG MEASURE.

<i>yd. ft. in.</i>	<i>L. m. f. p. yd. ft. in.</i>	<i>L. m. f. p. yd. ft. in.</i>
(2) 3 2 11	(3) 172 2 3 19 2. 2 4	(4) 462 1 7 29 1 1 10
1 1 9	0 0 0 14 1 0 3	0 0 0 11 0 1 10
2 0 8	0 1 2 29 0 0 10	4 1 2 28 1 2 9
3 1 10	0 0 4 0 0 0 0	0 0 0 18 0 0 0
2 0 4	0 0 2 0 0 0 10	
6 2 7	0 0 0 0 8 2 3	Ans. 467 0 3 1 4 0 5
Ans. 20 1 1	Ans. 173 1 4 28 2 1 0 6	

CLOTH MEASURE.

<i>E. E. qr. n.</i>	<i>E. F. qr. n.</i>
(2) 72 3 2	(3) 19 2 3
536 2 1	728 1 2
847 1 3	142 0 1
1453 0 2	816 0 0
41 2 0	32 1 2
Ans. 2951 0 0	Ans. 1739 0 0

COMPOUND ADDITION.

	<i>yd.</i>	<i>qr.</i>	<i>na.</i>
(4)	19	2	3
	14	2	0
	32	0	2
	0	3	1
	142	3	2

Ans. 210 0 0

	<i>E. Fr.</i>	<i>qr.</i>	<i>na.</i>
(5)	143	0	3
	17	2	2
	172	1	1
	182	1	3
	132	3	2
	72	1	1

Ans. 720 1 0

LAND MEASURE.

	<i>A.</i>	<i>R.</i>	<i>P.</i>
(2)	487	2	17
	25	3	28
	67	0	32
	45	1	16
	26	0	29

Ans. 652 1 2

	<i>A.</i>	<i>R.</i>	<i>P.</i>
(3)	22	2	0
	700	3	27
	47	0	5
	39	0	0
	47	2	39
	0	3	28

Ans. 858 0 19

	<i>A.</i>	<i>R.</i>	<i>P.</i>
(4)	132	3	25
	654	0	17
	462	3	25
	16	0	4
	1665	3	38

Ans. 2931 3 29

LIQUID MEASURE.

	<i>hd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>
(2)	385	42	3	1
	27	36	2	0
	132	17	0	0
	729	25	0	0
	163	47	2	1

Ans. 1438 43 0 0

	<i>T.</i>	<i>h.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>
(3)	19	2	19	0	0
	45	0	0	1	1
	0	3	17	2	0
	0	0	21	0	1

Ans. 65 1 58 0 0

	<i>T.</i>	<i>h.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>
(4)	862	1	0	1	0
	0	0	32	0	1
	0	0	37	2	0
	0	0	32	1	0
	0	2	0	0	1

Ans. 863 0 39 1 0

DRY MEASURE.

	<i>B.</i>	<i>p.</i>	<i>qt.</i>	<i>pt.</i>
(2)	47	2	4	1
	635	0	3	0
	247	3	0	1
	285	0	2	0
	734	2	5	0

Ans. 1950 0 7 0

	<i>B.</i>	<i>p.</i>	<i>qt.</i>	<i>pt.</i>
(3)	754	2	5	0
	469	0	2	0
	385	2	7	1
	375	0	0	1
	0	3	2	0

Ans. 1985 1 1 0

	<i>B.</i>	<i>p.</i>	<i>qt.</i>	<i>pt.</i>
(4)	144	3	2	1
	0	1	2	0
	0	0	3	1
	462	3	0	1
	72	0	5	1

Ans. 680 0 6 0

COMPOUND ADDITION.

25

TIME.

	<i>Y. m. w. d. h. m. sec.</i>		<i>Y. m. w. d. h. m. sec.</i>
(3)	172 0 1 0 4 0 52	(4)	462 4 0 0 5 37 24
	0 0 0 0 0 34 18		62 0 0 0 11 0 24
	15 4 0 5 3 27 0		0 0 1 5 0 13 0
	0 0 1 3 21 35 18		0 6 1 4 13 12 37

Ans. 187 4 3 2 5 37 28

Ans. 524 10 3 3 6 3 25

MOTION, OR CIRCLE MEASURE.

<i>sig. ° ' "</i>	<i>sig. ° ' "</i>	<i>sig. ° ' "</i>
(2) 2 7 32 16	(3) 5 10 46 38	(4) 0 0 45 0
0 5 27 24	0 11 37 18	1 9 0 18
1 6 17 13	1 0 47 12	0 14 21 34
0 7 38 24	0 0 0 18	2 8 13 54
4 5 42 19	2 0 0 52	4 7 12 19
	1 15 12 23	0 0 47 32
	0 11 57 29	

Ans. 8 2 37 36

Ans. 10 20 22 10

Ans. 8 10 20 37

APPLICATION.

<i>\$ cts.</i>	<i>Y. qr. na.</i>	<i>B. p. qt.</i>
(1) 375 45	(2) 57 2 0	(3) 2 2 0
142 37½	29 3 2	3 3 5
1375 56¼	45 1 0	3 1 1
	32 3 1	2 0 4
	38 2 0	
	38 2 0	

Ans. 1893 38½

Ans. 11 3 2

Ans. 242 1 3

<i>A. R. P.</i>	<i>Y. qr. na.</i>
(4) 142 2 0	(5) 15 3 0
32 3 12	18 1 2
108 3 18	25 3 2
Ans. 284 0 30	Ans. 60 0 0

COMPOUND MULTIPLICATION.

$$\begin{array}{r}
 \text{M. fur. p.} \\
 (6) \quad 43 \quad 3 \quad 0 \\
 \quad 29 \quad 0 \quad 34 \\
 \quad 57 \quad 2 \quad 32 \\
 \quad 12 \quad 3 \quad 18 \\
 \hline
 \end{array}$$

Ans. 142 2 4

$$\begin{array}{r}
 \text{B. p. qt.} \\
 (7) \quad 756 \quad 2 \quad 0 \\
 \quad 756 \quad 2 \quad 0 \\
 \quad 756 \quad 2 \quad 0 \\
 \quad 854 \quad 0 \quad 5 \\
 \quad 854 \quad 0 \quad 5 \\
 \hline
 \end{array}$$

Ans. 3977 3 2

—•••—

COMPOUND MULTIPLICATION.

EXAMPLES.

FEDERAL MONEY.

$$\begin{array}{r}
 \$ \quad \text{cts.} \\
 (4) \quad 26 \quad 18\frac{3}{4} \\
 \quad \quad \quad 6 \\
 \hline
 \end{array}$$

Ans. 157 12 $\frac{1}{2}$

$$\begin{array}{r}
 \$ \quad \text{cts.} \quad \text{m.} \\
 (5) \quad 100 \quad 40 \quad 4 \\
 \quad \quad \quad \quad 10 \\
 \hline
 \end{array}$$

Ans. 1004 04 0

$$\begin{array}{r}
 \$ \quad \text{cts.} \\
 (6) \quad 56 \quad 18\frac{3}{4} \\
 \quad \quad \quad 9 \\
 \hline
 \end{array}$$

Ans. 505 68 $\frac{3}{4}$

$$\begin{array}{r}
 \$ \quad \text{cts.} \quad \text{m.} \\
 (7) \quad 25 \quad 37 \quad 5 \\
 \quad \quad \quad \quad 8 \\
 \hline
 \end{array}$$

Ans. 203 00 0

$$\begin{array}{r}
 \$ \quad \text{cts.} \\
 (8) \quad 565 \quad 62\frac{1}{4} \\
 \quad \quad \quad 12 \\
 \hline
 \end{array}$$

Ans. 6787 50

ENGLISH MONEY.

$$\begin{array}{r}
 £ \quad \text{s.} \quad \text{d.} \\
 (2) \quad 14 \quad 6 \quad 0\frac{1}{4} \\
 \quad \quad \quad \quad 9 \\
 \hline
 \end{array}$$

Ans. 128 14 2 $\frac{1}{4}$

$$\begin{array}{r}
 £ \quad \text{s.} \quad \text{d.} \\
 (3) \quad 111 \quad 11 \quad 10\frac{1}{4} \\
 \quad \quad \quad \quad 10 \\
 \hline
 \end{array}$$

Ans. 1115 18 9

COMPOUND MULTIPLICATION.

27

$$\begin{array}{r} \text{£} \quad s. \quad d. \\ (4) \quad 37 \quad 6 \quad 9\frac{1}{2} \\ \quad \quad \quad 5 \end{array}$$

$$\text{Ans. } 186 \quad 13 \quad 11\frac{1}{2}$$

$$\begin{array}{r} \text{£} \quad s. \quad d. \\ (5) \quad 56 \quad 8 \quad 7\frac{3}{4} \\ \quad \quad \quad 9 \end{array}$$

$$\text{Ans. } 507 \quad 17 \quad 9\frac{3}{4}$$

AVOIRDUPOIS WEIGHT.

$$\begin{array}{r} T.cwt. \quad gr. \quad lb. \quad oz. \quad dr. \\ (2) \quad 6 \quad 14 \quad 2 \quad 7 \quad 5 \quad 2 \\ \quad \quad \quad \quad \quad \quad \quad 4 \end{array}$$

$$\text{Ans. } 26 \quad 18 \quad 1 \quad 1 \quad 4 \quad 8$$

$$\begin{array}{r} gr. \quad lb. \quad oz. \quad dr. \\ (3) \quad 3 \quad 16 \quad 7 \quad 8 \\ \quad \quad \quad \quad \quad \quad 10 \end{array}$$

$$\text{Ans. } 8 \quad 3 \quad 24 \quad 11 \quad 0$$

$$\begin{array}{r} Cwt. \quad gr. \quad lb. \\ (4) \quad 1 \quad 2 \quad 6 \\ \quad \quad \quad 10 \end{array}$$

$$\text{Ans. } 15 \quad 2 \quad 4$$

$$\begin{array}{r} Cwt. \quad gr. \quad lb. \\ (5) \quad 4 \quad 3 \quad 17 \\ \quad \quad \quad 11 \end{array}$$

$$\text{Ans. } 53 \quad 3 \quad 19$$

TROY WEIGHT.

$$\begin{array}{r} lb. \quad oz. \quad dwt. \quad gr. \\ (2) \quad 43 \quad 0 \quad 8 \quad 10 \\ \quad \quad \quad \quad \quad 4 \end{array}$$

$$\text{Ans. } 172 \quad 1 \quad 13 \quad 16$$

$$\begin{array}{r} lb. \quad oz. \quad dwt. \quad gr. \\ (3) \quad 113 \quad 6 \quad 0 \quad 6 \\ \quad \quad \quad \quad \quad 6 \end{array}$$

$$\text{Ans. } 681 \quad 0 \quad 1 \quad 12$$

$$\begin{array}{r} lb. \quad oz. \quad dwt. \\ (4) \quad 17 \quad 9 \quad 14 \\ \quad \quad \quad 10 \end{array}$$

$$\text{Ans. } 178 \quad 1 \quad 0$$

$$\begin{array}{r} lb. \quad oz. \quad dwt. \quad gr. \\ (5) \quad 41 \quad 6 \quad 18 \quad 2 \\ \quad \quad \quad \quad \quad 7 \end{array}$$

$$\text{Ans. } 291 \quad 0 \quad 6 \quad 14$$

$$\begin{array}{r} lb. \quad oz. \quad dwt. \quad gr. \\ (6) \quad 91 \quad 4 \quad 14 \quad 16 \\ \quad \quad \quad \quad \quad 8 \end{array}$$

$$\text{Ans. } 731 \quad 1 \quad 17 \quad 8$$

APOTHECARIES' WEIGHT.

$$\begin{array}{r} lb \quad \text{ʒ} \quad \text{ʒ} \quad \text{ʒ} \quad gr. \\ (2) \quad 53 \quad 10 \quad 0 \quad 2 \quad 12 \\ \quad \quad \quad \quad \quad 9 \end{array}$$

$$\text{Ans. } 484 \quad 6 \quad 7 \quad 2 \quad 8$$

$$\begin{array}{r} lb \quad \text{ʒ} \quad \text{ʒ} \quad \text{ʒ} \quad gr. \\ (3) \quad 17 \quad 5 \quad 6 \quad 1 \quad 4 \\ \quad \quad \quad \quad \quad 12 \end{array}$$

$$\text{Ans. } 209 \quad 9 \quad 4 \quad 2 \quad 8$$

COMPOUND MULTIPLICATION.

$$\begin{array}{r} \text{H} \quad \text{3} \quad \text{3} \quad \text{9} \\ (4) \quad 76 \quad 4 \quad 1 \quad 2 \\ \hline 9 \end{array}$$

$$\text{Ans. } 687 \quad 1 \quad 7 \quad 0$$

$$\begin{array}{r} \text{H} \quad \text{3} \quad \text{3} \quad \text{9} \quad \text{gr.} \\ (5) \quad 95 \quad 1 \quad 2 \quad 1 \quad 11 \\ \hline 11 \end{array}$$

$$\text{Ans. } 1046 \quad 2 \quad 3 \quad 2 \quad 1$$

LONG MEASURE.

$$\begin{array}{r} L. \quad M. \quad fur. \quad p. \\ (2) \quad 4 \quad 2 \quad 2 \quad 29 \\ \hline 7 \end{array}$$

$$\text{Ans. } 33 \quad 1 \quad 3 \quad 3$$

$$\begin{array}{r} M. \quad fur. \quad p. \quad yd. \quad ft. \quad in. \\ (3) \quad 18 \quad 3 \quad 20 \quad 1 \quad 2 \quad 10 \\ \hline 5 \end{array}$$

$$\text{Ans. } 92 \quad 1 \quad 21 \quad 3\frac{1}{2} \quad 2 \quad 2$$

$$\begin{array}{r} Deg. \quad m. \quad fur. \\ (4) \quad 6 \quad 40 \quad 7 \\ \hline 10 \end{array}$$

$$\text{Ans. } 66 \quad 48 \quad 6$$

$$\begin{array}{r} M. \quad fur. \quad p. \\ (5) \quad 44 \quad 6 \quad 20 \\ \hline 7 \end{array}$$

$$\text{Ans. } 313 \quad 5 \quad 20$$

CLOTH MEASURE.

$$\begin{array}{r} E. E. \quad qr. \quad na. \\ (2) \quad 37 \quad 4 \quad 2 \\ \hline 8 \end{array}$$

$$\text{Ans. } 303 \quad 1 \quad 0$$

$$\begin{array}{r} E. Fl. \quad qr. \quad na. \\ (3) \quad 18 \quad 0 \quad 3 \\ \hline 12 \end{array}$$

$$\text{Ans. } 219 \quad 0 \quad 0$$

$$\begin{array}{r} E. Fr. \quad qr. \quad na. \\ (4) \quad 14 \quad 1 \quad 3 \\ \hline 9 \end{array}$$

$$\text{Ans. } 129 \quad 0 \quad 3$$

$$\begin{array}{r} Yds. \quad qr. \quad na. \\ (5) \quad 19 \quad 1 \quad 2 \\ \hline 5 \end{array}$$

$$\text{Ans. } 96 \quad 3 \quad 2$$

$$\begin{array}{r} E. \quad E. \quad qr. \\ (6) \quad 56 \quad 3 \\ \hline 9 \end{array}$$

$$\text{Ans. } 509 \quad 2$$

LAND MEASURE.

$$\begin{array}{r} A. \quad R. \quad P. \\ (2) \quad 19 \quad 3 \quad 20 \\ \hline 6 \end{array}$$

$$\text{Ans. } 119 \quad 1 \quad 00$$

$$\begin{array}{r} A. \quad R. \quad P. \\ (3) \quad 10 \quad 0 \quad 33 \\ \hline 9 \end{array}$$

$$\text{Ans. } 91 \quad 3 \quad 17$$

$$\begin{array}{r} A. \quad R. \quad P. \\ (4) \quad 1 \quad 3 \quad 11 \\ \hline 10 \end{array}$$

$$\text{Ans. } 18 \quad 0 \quad 30$$

$$\begin{array}{r} A. \quad R. \quad P. \\ (5) \quad 63 \quad 3 \quad 18 \\ \hline 11 \end{array}$$

$$\text{Ans. } 702 \quad 1 \quad 38$$

LIQUID MEASURE.

$$\begin{array}{r} T. hhd. gal. qt. pt. \\ (2) \quad 1 \ 2 \ 16 \ 3 \ 1 \\ \quad \quad \quad 10 \\ \hline \end{array}$$

$$\text{Ans. } 15 \ 2 \ 42 \ 3 \ 0$$

$$\begin{array}{r} P. hhd. gal. qt. pt. \\ (3) \quad 4 \ 1 \ 19 \ 3 \ 1 \\ \quad \quad \quad 5 \\ \hline \end{array}$$

$$\text{Ans. } 23 \ 0 \ 36 \ 1 \ 1$$

$$\begin{array}{r} T. h. gal. qt. \\ (4) \quad 3 \ 2 \ 50 \ 2 \\ \quad \quad \quad 8 \\ \hline \end{array}$$

$$\text{Ans. } 29 \ 2 \ 26 \ 0$$

$$\begin{array}{r} H. gal. q. pt. \\ (5) \quad 4 \ 41 \ 0 \ 1 \\ \quad \quad \quad 10 \\ \hline \end{array}$$

$$\text{Ans. } 46 \ 33 \ 1 \ 0$$

DRY MEASURE.

$$\begin{array}{r} Bu. pe. qt. pt. \\ (2) \quad 1 \ 3 \ 3 \ 1 \\ \quad \quad \quad 4 \\ \hline \end{array}$$

$$\text{Ans. } 7 \ 1 \ 6 \ 0$$

$$\begin{array}{r} Bu. pe. qt. pt. \\ (3) \quad 110 \ 3 \ 0 \ 1 \\ \quad \quad \quad 4 \\ \hline \end{array}$$

$$\text{Ans. } 443 \ 0 \ 2 \ 0$$

$$\begin{array}{r} R. pe. qt. pt. \\ (4) \quad 44 \ 0 \ 0 \ 1 \\ \quad \quad \quad 7 \\ \hline \end{array}$$

$$\text{Ans. } 308 \ 0 \ 8 \ 1$$

$$\begin{array}{r} P. qt. \\ (5) \quad 3 \ 1 \\ \quad \quad 9 \\ \hline \end{array}$$

$$\text{Ans. Bush. } 7 \ 0 \ 1$$

TIME.

$$\begin{array}{r} Y. m. w. d. h. min. sec. \\ (2) \quad 17 \ 8 \ 2 \ 6 \ 4 \ 40 \ 18 \\ \quad \quad \quad 6 \\ \hline \end{array}$$

$$\text{Ans. } 106 \ 4 \ 1 \ 2 \ 4 \ 1 \ 48$$

$$\begin{array}{r} W. d. h. \\ (3) \quad 3 \ 5 \ 22 \\ \quad \quad 12 \\ \hline \end{array}$$

$$\text{Ans. } 46 \ 1 \ 0$$

$$\begin{array}{r} Y. m. w. d. \\ (4) \quad 7 \ 0 \ 4 \ 4 \\ \quad \quad 9 \\ \hline \end{array}$$

$$\text{Ans. } 63 \ 10 \ 1 \ 1$$

$$\begin{array}{r} Y. m. w. d. \\ (5) \quad 15 \ 2 \ 0 \ 6 \\ \quad \quad 8 \\ \hline \end{array}$$

$$\text{Ans. } 121 \ 5 \ 2 \ 6$$

RULE 2.

EXAMPLES.

(2) Multiply $\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 37 \quad 10 \quad 6\frac{3}{4} \end{array}$ by 48
 $6 \times 8 = 48$

$$\begin{array}{r} 225 \quad 3 \quad 4\frac{1}{2} \\ 8 \end{array}$$

Ans. 1801 7 0

(3) $\begin{array}{r} \$ \quad \text{cts.} \quad \text{m.} \\ 66 \quad 37 \quad 5 \end{array}$ by 36
 $6 \times 6 = 36$

$$\begin{array}{r} 398 \quad 25 \quad 0 \\ 6 \end{array}$$

Ans. 2369 50 0

(4) $\begin{array}{r} \$ \quad \text{cts.} \quad \text{m.} \\ 44 \quad 25 \quad 3 \end{array}$ by 56
 $7 \times 8 = 56$

$$\begin{array}{r} 309 \quad 77 \quad 1 \\ 8 \end{array}$$

Ans. 2478 16 8

(5) $\begin{array}{r} \$ \quad \text{cts.} \\ 12 \quad 18\frac{3}{4} \end{array}$ by 96
 $12 \times 8 = 96$

$$\begin{array}{r} 146 \quad 25 \\ 8 \end{array}$$

Ans. 1170 00

(6) $\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 45 \quad 6 \quad 9\frac{1}{2} \end{array}$ by 120
 $12 \times 10 = 120$

$$\begin{array}{r} 544 \quad 1 \quad 6 \\ 10 \end{array}$$

Ans. 5440 15 0

(7) $\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 96 \quad 12 \quad 3\frac{3}{4} \end{array}$ by 144
 $12 \times 12 = 144$

$$\begin{array}{r} 1159 \quad 7 \quad 9 \\ 12 \end{array}$$

Ans. 13912 13 0

(8) $\begin{array}{r} \text{A.} \quad \text{R.} \quad \text{P.} \\ 47 \quad 3 \quad 20 \end{array}$ by 54
 $6 \times 9 = 54$

$$\begin{array}{r} 287 \quad 1 \quad 0 \\ 9 \end{array}$$

Ans. 2585 1 0

(9) $\begin{array}{r} \text{M.} \quad \text{f.} \quad \text{p.} \\ 48 \quad 7 \quad 25 \end{array}$ by 88
 $11 \times 8 = 88$

$$\begin{array}{r} 538 \quad 3 \quad 35 \\ 8 \end{array}$$

Ans. 4307 7 0

COMPOUND MULTIPLICATION.

31

(10) $lb, oz. dr.$
 $56 \ 9 \ 6 \text{ by } 84$
 $12 \times 7 = 84$

$$\begin{array}{r} 681 \ 9 \ 0 \\ 7 \end{array}$$

Ans. 4772 3 0

RULE 3.

EXAMPLES.

(2) Multiply $\$ \ 7 \ 87\frac{1}{2} \text{ cts.}$
 $11 \times 4 + 3 = 47$

$$\begin{array}{r} 86 \ 62\frac{1}{2} \\ 4 \end{array}$$

$$\begin{array}{r} 346 \ 50 \\ 23 \ 62\frac{1}{2} \end{array}$$

Ans. 370 12 $\frac{1}{2}$

(4) $\$ \ 49 \ 75 \times 3 \text{ cts.}$
 12

$$\begin{array}{r} 597 \ 00 \\ 7 \end{array}$$

$$\begin{array}{r} 4179 \ 00 \\ 149 \ 25 \end{array}$$

Ans. 4328 25

(3) $\$ \ 28 \ 68\frac{3}{4} \text{ cts.}$
 $11 \times 6 + 2 = 68$

$$\begin{array}{r} 315 \ 56\frac{1}{4} \\ 6 \end{array}$$

$$\begin{array}{r} 1893 \ 37\frac{1}{2} \\ 57 \ 37\frac{1}{2} \end{array}$$

Ans. 950 75

(5) $\$ \ 94 \ 18\frac{3}{4} \times 1 \text{ cts.}$
 10

$$\begin{array}{r} 941 \ 87\frac{1}{2} \\ 3 \end{array}$$

$$\begin{array}{r} 2825 \ 62\frac{1}{2} \\ 94 \ 18\frac{3}{4} \end{array}$$

Ans. 2919 81 $\frac{1}{4}$

COMPOUND MULTIPLICATION.

$$(6) \quad \begin{array}{r} \text{£} \text{ s.} \\ 42 \text{ } 31\frac{1}{4} \times 3 \\ \underline{11} \end{array}$$

$$\begin{array}{r} 465 \text{ } 43\frac{1}{4} \\ \underline{5} \end{array}$$

$$\begin{array}{r} 2327 \text{ } 18\frac{1}{4} \\ \underline{126 \text{ } 93\frac{1}{4}} \end{array}$$

$$\text{Ans. } \underline{\underline{2454 \text{ } 12\frac{1}{4}}}$$

$$(7) \quad \begin{array}{r} \text{£} \text{ s.} \text{ d.} \\ 28 \text{ } 7 \text{ } 6\frac{1}{4} \times 1 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 113 \text{ } 10 \text{ } 2 \\ \underline{7} \end{array}$$

$$\begin{array}{r} 794 \text{ } 11 \text{ } 2 \\ \underline{28 \text{ } 7 \text{ } 6\frac{1}{4}} \end{array}$$

$$\text{Ans. } \underline{\underline{802 \text{ } 18 \text{ } 8\frac{1}{4}}}$$

$$(8) \quad \begin{array}{r} \text{£} \text{ s.} \text{ d.} \\ 34 \text{ } 8 \text{ } 4\frac{1}{4} \times 1 \\ \underline{11} \end{array}$$

$$\begin{array}{r} 378 \text{ } 12 \text{ } 4\frac{1}{4} \\ \underline{6} \end{array}$$

$$\begin{array}{r} 2271 \text{ } 14 \text{ } 1\frac{1}{4} \\ \underline{34 \text{ } 8 \text{ } 4\frac{1}{4}} \end{array}$$

$$\text{Ans. } \underline{\underline{2306 \text{ } 2 \text{ } 6\frac{1}{4}}}$$

$$(9) \quad \begin{array}{r} \text{Cwt.} \text{ qrs.} \text{ lb.} \\ 7 \text{ } 3 \text{ } 22 \times 1 \\ \underline{10} \end{array}$$

$$\begin{array}{r} 79 \text{ } 1 \text{ } 24 \\ \underline{5} \end{array}$$

$$\begin{array}{r} 397 \text{ } 1 \text{ } 8 \\ \underline{7 \text{ } 3 \text{ } 22} \end{array}$$

$$\text{Ans. } \underline{\underline{405 \text{ } 1 \text{ } 2}}$$

$$(10) \quad \begin{array}{r} \text{lbs.} \text{ oz.} \text{ dwt.} \\ 12 \text{ } 5 \text{ } 8 \times 3 \\ \underline{12} \end{array}$$

$$\begin{array}{r} 149 \text{ } 4 \text{ } 16 \\ \underline{3} \end{array}$$

$$\begin{array}{r} 448 \text{ } 2 \text{ } 8 \\ \underline{37 \text{ } 4 \text{ } 4} \end{array}$$

$$\text{Ans. } \underline{\underline{465 \text{ } 6 \text{ } 12}}$$

$$(11) \quad \begin{array}{r} \text{M.} \text{ f.} \text{ p.} \\ 4 \text{ } 6 \text{ } 21 \times 3 \\ \underline{12} \end{array}$$

$$\begin{array}{r} 57 \text{ } 6 \text{ } 12 \\ \underline{7} \end{array}$$

$$\begin{array}{r} 404 \text{ } 4 \text{ } 4 \\ \underline{14 \text{ } 3 \text{ } 23} \end{array}$$

$$\text{Ans. } \underline{\underline{418 \text{ } 7 \text{ } 27}}$$

RULE 4.

EXAMPLES.

(2) Multiply $\begin{array}{r} \$ \\ 1 \end{array} \begin{array}{r} cts. \\ 56\frac{1}{4} \end{array} \times 6$
 $\begin{array}{r} 10 \end{array}$

$$\begin{array}{r} 15 \quad 65 \times 5 \\ 10 \end{array}$$

$$\begin{array}{r} 156 \quad 50 \\ 4 \end{array}$$

$$\begin{array}{r} 626 \quad 00 \\ 78 \quad 25 \\ 9 \quad 39 \end{array}$$

Ans. $\begin{array}{r} 713 \quad 64 \end{array}$

(3) $\begin{array}{r} \$ \\ 2 \end{array} \begin{array}{r} cts. \\ 87\frac{1}{4} \end{array} \times 6$
 $\begin{array}{r} 10 \end{array}$

$$\begin{array}{r} 28 \quad 75 \times 7 \\ 10 \end{array}$$

$$\begin{array}{r} 287 \quad 50 \\ 5 \end{array}$$

$$\begin{array}{r} 1437 \quad 50 \\ 201 \quad 25 \\ 17 \quad 25 \end{array}$$

Ans. $\begin{array}{r} 1656 \quad 00 \end{array}$

(4) $\begin{array}{r} \$ \\ 4 \end{array} \begin{array}{r} cts. \\ 31\frac{1}{4} \end{array} \times 9$
 $\begin{array}{r} 10 \end{array}$

$$\begin{array}{r} 43 \quad 12\frac{1}{2} \times 7 \\ 10 \end{array}$$

$$\begin{array}{r} 431 \quad 25 \\ 6 \end{array}$$

$$\begin{array}{r} 2587 \quad 50 \\ 301 \quad 87\frac{1}{4} \\ 38 \quad 81\frac{1}{4} \end{array}$$

Ans. $\begin{array}{r} 2928 \quad 18\frac{3}{4} \end{array}$

(5) $\begin{array}{r} \$ \\ 18 \end{array} \begin{array}{r} cts. \\ 93\frac{3}{4} \end{array} \times 7$
 $\begin{array}{r} 10 \end{array}$

$$\begin{array}{r} 189 \quad 37\frac{1}{2} \times 5 \\ 10 \end{array}$$

$$\begin{array}{r} 1893 \quad 75 \\ 4 \end{array}$$

$$\begin{array}{r} 7575 \quad 00 \\ 946 \quad 87\frac{1}{4} \\ 132 \quad 56\frac{1}{4} \end{array}$$

Ans. $\begin{array}{r} 8654 \quad 43\frac{3}{4} \end{array}$

COMPOUND MULTIPLICATION.

$$(6) \quad \begin{array}{r} \$ \\ 25 \end{array} \begin{array}{r} cts. \\ 43\frac{3}{4} \end{array} \times 9$$

$$\begin{array}{r} 254 \\ 10 \end{array}$$

$$\begin{array}{r} 254 \\ 10 \end{array} \begin{array}{r} 37\frac{1}{2} \\ 10 \end{array} \times 7$$

$$\begin{array}{r} 2543 \\ 8 \end{array}$$

$$\begin{array}{r} 2543 \\ 8 \end{array}$$

$$\begin{array}{r} 20350 \\ 1780 \\ 228 \end{array} \begin{array}{r} 00 \\ 62\frac{1}{2} \\ 93\frac{3}{4} \end{array}$$

$$\text{Ans. } 22359 \quad 56\frac{1}{4}$$

$$(7) \quad \begin{array}{r} \$ \\ 0 \end{array} \begin{array}{r} cts. \\ 1\frac{3}{4} \end{array} \times 6$$

$$\begin{array}{r} 0 \\ 10 \end{array}$$

$$\begin{array}{r} 0 \\ 10 \end{array} \begin{array}{r} 17\frac{1}{2} \\ 10 \end{array} \times 6$$

$$\begin{array}{r} 1 \\ 10 \end{array}$$

$$\begin{array}{r} 1 \\ 10 \end{array} \begin{array}{r} 75 \\ 10 \end{array} \times 2$$

$$\begin{array}{r} 17 \\ 2 \end{array}$$

$$\begin{array}{r} 17 \\ 2 \end{array}$$

$$\begin{array}{r} 35 \\ 3 \\ 1 \end{array} \begin{array}{r} 00 \\ 50 \\ 00 \end{array}$$

$$\begin{array}{r} 35 \\ 3 \\ 1 \end{array} \begin{array}{r} 00 \\ 50 \\ 00 \end{array}$$

$$\begin{array}{r} 10\frac{1}{2} \end{array}$$

$$\text{Ans. } 39 \quad 65\frac{1}{2}$$

$$(8) \quad \begin{array}{r} \$ \\ 10 \end{array} \begin{array}{r} cts. \\ 16\frac{1}{2} \end{array} \times 9$$

$$\begin{array}{r} 101 \\ 10 \end{array}$$

$$\begin{array}{r} 101 \\ 10 \end{array} \begin{array}{r} 65 \\ 10 \end{array} \times 3$$

$$\begin{array}{r} 1016 \\ 9 \end{array}$$

$$\begin{array}{r} 1016 \\ 9 \end{array}$$

$$\begin{array}{r} 9148 \\ 304 \\ 91 \end{array} \begin{array}{r} 50 \\ 95 \\ 48\frac{1}{2} \end{array}$$

$$\text{Ans. } 9544 \quad 93\frac{1}{2}$$

$$(9) \quad \begin{array}{r} £ \\ 37 \end{array} \begin{array}{r} s. \\ 18 \end{array} \begin{array}{r} d. \\ 6\frac{1}{2} \end{array} \times 5$$

$$\begin{array}{r} 379 \\ 10 \end{array}$$

$$\begin{array}{r} 379 \\ 10 \end{array} \begin{array}{r} 5 \\ 10 \end{array} \begin{array}{r} 2\frac{1}{2} \\ 10 \end{array} \times 7$$

$$\begin{array}{r} 3792 \\ 3 \end{array}$$

$$\begin{array}{r} 3792 \\ 3 \end{array}$$

$$\begin{array}{r} 11377 \\ 2654 \\ 189 \end{array} \begin{array}{r} 16 \\ 16 \\ 12 \end{array} \begin{array}{r} 3 \\ 5\frac{1}{2} \\ 7\frac{1}{2} \end{array}$$

$$\text{Ans. } 14222 \quad 5 \quad 3\frac{3}{4}$$

$$(10) \begin{array}{r} \text{£. s. d.} \\ 48 \text{ } 14 \text{ } 2\frac{1}{4} \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 487 \text{ } 2 \text{ } 1 \times 8 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 4871 \text{ } 0 \text{ } 10 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 19484 \text{ } 3 \text{ } 4 \\ 3896 \text{ } 16 \text{ } 8 \\ 438 \text{ } 7 \text{ } 10\frac{1}{4} \\ \hline \end{array}$$

$$\text{Ans. } 23819 \text{ } 7 \text{ } 10\frac{1}{4}$$

$$(11) \begin{array}{r} \text{£. s. d.} \\ 64 \text{ } 2 \text{ } 8 \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 641 \text{ } 6 \text{ } 8 \times 5 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 6413 \text{ } 6 \text{ } 8 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 32066 \text{ } 13 \text{ } 4 \\ 3206 \text{ } 13 \text{ } 4 \\ 320 \text{ } 13 \text{ } 4 \\ \hline \end{array}$$

$$\text{Ans. } 35594 \text{ } 0 \text{ } 0$$

$$(12) \begin{array}{r} \text{£. s. d.} \\ 58 \text{ } 9 \text{ } 6\frac{1}{4} \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 584 \text{ } 15 \text{ } 7\frac{1}{2} \times 9 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 5847 \text{ } 16 \text{ } 3 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 17543 \text{ } 8 \text{ } 9 \\ 5263 \text{ } 0 \text{ } 7\frac{1}{2} \\ 350 \text{ } 17 \text{ } 4\frac{1}{2} \\ \hline \end{array}$$

$$\text{Ans. } 23157 \text{ } 6 \text{ } 9$$

$$(13) \begin{array}{r} \text{M. f. p.} \\ 25 \text{ } 3 \text{ } 18 \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 254 \text{ } 2 \text{ } 20 \times 6 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 2543 \text{ } 1 \text{ } 0 \times 2 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 25431 \text{ } 2 \text{ } 0 \\ 5086 \text{ } 2 \text{ } 0 \\ 1525 \text{ } 7 \text{ } 0 \\ 127 \text{ } 1 \text{ } 10 \\ \hline \end{array}$$

$$\text{Ans. } 32170 \text{ } 4 \text{ } 10$$

COMPOUND MULTIPLICATION.

<i>F. in.b.c.</i>	<i>Yd. qr. n.</i>	<i>Hhd. gal. qt.</i>
(14) 48 4 2 × 7	(15) 22 2 1 × 4	(16) 4 37 2 by 4250
10	10	10
483 10 2 × 8	225 2 2	45 60 0 × 5
10	10	10
4838 10 2 × 5	2256 1 0 × 2	459 33 0 × 2
10	10	10
48388 10 2	22562 2 0	4595 15 0
2	3	4
96777 9 1	67687 2 0	18380 60 0
24194 5 1	4512 2 0	919 3 0
3871 1 1	90 1 0	229 48 0
338 8 2		
	Ans. 72290 1 0	Ans. 19529 48 0
Ans. 125182 0 2		

APPLICATION.

(1) \$12.50	(2) \$1.07	(3) \$5.62½	(4) \$1.12½
5	9	12	6
Ans. 62.50	Ans. 9.63	Ans. 67.50	6.75
			4
			Ans. 27.00

<i>£ s. d.</i>	<i>\$ cts.</i>
(5) 0 2 2 by 63	(6) 3 87½ by 64
7	8
0 15 2	31 00
9	8
Ans. 6 16 6	Ans. 248 00

COMPOUND MULTIPLICATION.

37

<p>(7) $\begin{array}{r} \\$ \text{ cts.} \\ 0 \ 15\frac{1}{4} \times 6 \\ \hline 10 \\ \hline 1 \ 52\frac{1}{4} \\ \hline 10 \\ \hline 15 \ 25 \\ \hline 0 \ 91\frac{1}{4} \\ \hline \text{Ans. } 16 \ 16\frac{1}{4} \end{array}$</p>	<p>(8) $\begin{array}{r} £ \ s. \ d. \\ 0 \ 1 \ 3 \\ \hline 12 \\ \hline 0 \ 15 \ 0 \\ \hline 11 \\ \hline \text{Ans. } 8 \ 5 \ 0 \end{array}$</p>	<p>(9) $\begin{array}{r} \\$ \text{ cts.} \\ 9 \ 10 \times 5 \\ \hline 10 \\ \hline 91 \ 0 \times 6 \\ \hline 10 \\ \hline 910 \ 0 \\ \hline 3 \\ \hline 2730 \ 0 \\ \hline 546 \ 0 \\ \hline 45 \ 50 \\ \hline \text{Ans. } 3321 \ 50 \end{array}$</p>
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<p>(10) $\begin{array}{r} £ \ s. \ d. \\ 0 \ 9 \ 6 \text{ per acre} \times 5 \\ \hline 10 \\ \hline 4 \ 15 \ 0 \times 2 \\ \hline 10 \\ \hline 47 \ 10 \ 0 \\ \hline 3 \\ \hline 142 \ 10 \ 0 \\ \hline 9 \ 10 \ 0 \\ \hline 2 \ 7 \ 6 \\ \hline \text{Ans. } 154 \ 7 \ 6 \end{array}$</p>	<p>(11) $\begin{array}{r} \\$ \text{ cts.} \\ 1 \ 18\frac{3}{4} \times 7 \\ \hline 10 \\ \hline 11 \ 87\frac{3}{4} \times 1 \\ \hline 10 \\ \hline 118 \ 75 \\ \hline 2 \\ \hline 237 \ 50 \\ \hline 11 \ 87\frac{3}{4} \\ \hline 8 \ 31\frac{1}{4} \\ \hline \text{Ans. } 257 \ 68\frac{3}{4} \text{ prime cost.} \end{array}$</p>
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COMPOUND SUBTRACTION.

Again: \$1 37½ × 7
10

13 75 × 1
10

137 50
2

275 00
13 75
9 62½

\$298 37½ sold for.
\$257 68½ prime cost.

\$40 68½ gain.



COMPOUND SUBTRACTION.

EXAMPLES.

FEDERAL MONEY.

\$ cts. m.
(2) From 24 60 7
Take 19 30 0

Ans. 5 30 7

\$ cts.
(3) 600 62½
1 75

Ans. 598 87½

\$ cts.
(4) 110 18½
99 10½

Ans. 11 8½

\$ cts. m.
(5) 960 10 2
9

Ans. 960 09 3

\$ cts.
(6) 449 62½
1 06½

Ans. 448 55½

\$ cts.
(7) 1886 00
278 11½

Ans. 1587 88½

COMPOUND SUBTRACTION.

39

	£	cts.		£	cts.		£	cts.
(8)	104	06½	(9)	4010	14 4	(10)	400	00
		9½		1011	12 5		211	12½
Ans.	103	96½	Ans.	2999	1 9	Ans.	188	87½

ENGLISH MONEY.

	£	s.	d.		£	s.	d.
(2)	47	6	7½	(3)	419	7	6
	28	5	10½		227	8	9½
Ans.	19	0	9½	Ans.	191	18	8½
	£	s.	d.		£	s.	d.
(4)	1000	11	11½	(5)	1000	2	4½
	200	9	0		60	7	8½
Ans.	800	2	11½	Ans.	939	14	7½

AVOIRDUPOIS WEIGHT.

	<i>T. cwt.</i>	<i>qr.</i>	<i>lb.</i>	<i>oz.</i>	<i>dr.</i>		<i>cwt.</i>	<i>qr.</i>	<i>lb.</i>	<i>oz.</i>
(2)	18	16	1	16	9 2	(3)	9	3	20	2
	0	19	3	20	0 6				2	23 5
<hr/>						<hr/>				
Ans.	17	16	1	24	8 12		Ans.	9	0	24 13
<hr/>						<hr/>				
	<i>T. cwt.</i>	<i>qr.</i>	<i>lb.</i>				<i>Cwt.</i>	<i>qr.</i>	<i>lb.</i>	
(4)	14	10	2	16		(5)	400	0	0	
	0	0	0	11				2	3	14
<hr/>						<hr/>				
Ans.	14	10	2	5		Ans.	397	0	14	

TROY WEIGHT.

	lb.	oz.	dwt.	gr.		lb.	oz.	dwt.	gr.
(2)	8	3	0	2	(3)	106	0	0	15
	2	1	18	6			10	6	2 20
Ans.	6	1	1	20	Ans.	95	5	17	19

COMPOUND SUBTRACTION.

$$\begin{array}{r} \text{lb. oz. dwt. gr.} \\ (4) \quad 22 \quad 0 \quad 12 \quad 6 \\ \quad 14 \quad 6 \quad 11 \quad 0 \\ \hline \end{array}$$

Ans. 7 6 1 6

$$\begin{array}{r} \text{lb. oz. dwt. gr.} \\ (5) \quad 16 \quad 0 \quad 0 \quad 0 \\ \quad 12 \quad 11 \quad 10 \quad 11 \\ \hline \end{array}$$

Ans. 3 0 9 13

APOTHECARIES' WEIGHT.

$$\begin{array}{r} \text{lb. } \text{ss} \text{ } \text{gr.} \\ (2) \quad 48 \quad 9 \quad 6 \quad 1 \quad 4 \\ \quad 1 \quad 10 \quad 0 \quad 2 \quad 8 \\ \hline \end{array}$$

Ans. 46 11 5 1 16

$$\begin{array}{r} \text{lb. } \text{ss} \text{ } \text{gr.} \\ (3) \quad 59 \quad 1 \quad 2 \\ \quad 53 \quad 7 \quad 5 \\ \hline \end{array}$$

Ans. 5 5 5

$$\begin{array}{r} \text{lb. } \text{ss} \text{ } \text{gr.} \\ (4) \quad 69 \quad 0 \quad 0 \\ \quad 14 \quad 9 \quad 1 \\ \hline \end{array}$$

Ans. 54 2 7

CLOTH MEASURE.

$$\begin{array}{r} \text{yd. qr. na.} \\ (2) \quad 950 \quad 1 \quad 2 \\ \quad 19 \quad 2 \quad 3 \\ \hline \end{array} \quad \begin{array}{r} \text{yd. qr. na.} \\ (3) \quad 49 \quad 0 \quad 2 \\ \quad 16 \quad 2 \quad 1 \\ \hline \end{array} \quad \begin{array}{r} \text{E.E. qr. na.} \\ (4) \quad 66 \quad 4 \quad 0 \\ \quad 17 \quad 6 \quad 2 \\ \hline \end{array} \quad \begin{array}{r} \text{E.Fr. qr.} \\ (5) \quad 44 \quad 1 \\ \quad 19 \quad 2 \\ \hline \end{array}$$

Ans. 930 2 3

Ans. 32 2 1

Ans. 49 3 2

Ans. 24 4

$$\begin{array}{r} \text{E.Fl. qr.} \\ (6) \quad 963 \quad 1 \\ \quad 174 \quad 2 \\ \hline \end{array} \quad \begin{array}{r} \text{Yd. qr. na.} \\ (7) \quad \text{Bought} \quad 17 \quad 2 \quad 0 \\ \quad \text{Damaged} \quad 2 \quad 3 \quad 1 \\ \hline \end{array} \quad \begin{array}{r} \text{Yd. qr. na.} \\ (8) \quad 75 \quad 3 \quad 1 \\ \quad 0 \quad 0 \quad 1 \\ \hline \end{array}$$

Ans. 788 2

Remains good 14 2 3

Ans. 75 3 0

LONG MEASURE.

$$\begin{array}{r} \text{Deg. m. fur. p.} \\ (2) \quad 20 \quad 50 \quad 4 \quad 20 \\ \quad 11 \quad 56 \quad 0 \quad 30 \\ \hline \end{array} \quad \begin{array}{r} \text{M. fur. p.} \\ (3) \quad \text{Travels first day} \quad 43 \quad 5 \quad 20 \\ \quad \text{second do.} \quad 32 \quad 4 \quad 00 \\ \hline \end{array}$$

Ans. 8 54 3 30

Ans. 11 1 20 more.

LAND MEASURE.

$$\begin{array}{r} \text{A. R. P.} \\ (2) \quad 502 \quad 2 \quad 10 \\ \quad 111 \quad 3 \quad 9 \\ \hline \end{array}$$

Ans. 390 3 1

$$\begin{array}{r} \text{A. R. P.} \\ (3) \quad 69 \quad 1 \quad 3 \\ \quad 17 \quad 3 \quad 2 \\ \hline \end{array}$$

Ans. 51 2 1

COMPOUND SUBTRACTION.

41

LIQUID MEASURE.

	<i>T. hhd. gal. qt. pt.</i>		<i>Hhd. gal.</i>
(2)	100 1 19 2 1	(3)	2 0
	99 1 28 3 1		0 29
Ans.	3 53 3 0	Ans.	1 34

(4) From 1 pipe of wine, which is 126 gals., subtract 93, leaves 33 gals. of wine. Then from 4 hhds. of brandy, subtract 29 gals., leaves 223 of brandy. Then from 2 bbls. of beer, subtract 1, leaves 1 barrel, which is $31\frac{1}{2}$ gals.
Answer, 33 gals. wine, 223 gals. brandy, $31\frac{1}{2}$ gals. beer.

DRY MEASURE.

	<i>B. p. qt. pt.</i>		<i>B. p. qt. pt.</i>		<i>B. p. qt. pt.</i>
(2)	10 0 0 1	(3)	695 3 0 1	(5)	600 2 7 1
	9 2 6 1		589 3 5 0		146 3 2 1
Ans.	1 2 0	Ans.	105 3 3 1	Ans.	453 3 5 0

TIME.

	<i>H. min. sec.</i>		<i>Y. m. w.</i>
(2)	16 29 33	(3)	18 11 2
	7 36 44		9 10 3
Ans.	8 52 49	Ans.	9 0 3
	<i>Y. m. w. d.</i>		<i>Y. m. w. d. h.</i>
(4)	900 0 0 0	(5)	6 0 0 0 0
	111 6 2 6		1 1 1 1 1
Ans.	788 5 1 1	Ans.	4 10 2 5 23

MOTION, OR CIRCLE MEASURE.

	<i>sig. ° ' "</i>		<i>sig. ° ' "</i>		<i>sig. ° ' "</i>
(2)	9 7 40 8	(3)	10 10 16 12	(4)	11 2 5 14
	7 9 57 19		7 24 37 59		9 0 7 20
Ans.	1 27 42 49	Ans.	2 15 38 13	Ans.	2 1 57 54

APPLICATION.

- (1) 6 feet of chain at \$2,75
 per foot = \$16 50
 A gold ring for 4 50
 Ear-rings 12 00
-
- \$33 00 whole amount.
 Ring 4 50 has been returned
-
- To receive \$28 50
-

- (2) 2 doz. pairs at 75 cts. = \$ 18 00
 16 yds. at 87½ — = 14 00
 28 do. at 22 — = 6 18
 5 pair at 31½ — = 1 56½
-
- Amount 39 72½
 Note delivered 50 00
-
- Must be returned 10 27½
-

- | | <i>A.</i> | <i>R.</i> | <i>P.</i> | | <i>£</i> | <i>s.</i> |
|------------------------|-----------|-----------|-----------|-----------|----------|-----------|
| (3) 1st tract contains | 690 | 2 | 16 | (4) | 55 | 6 |
| 2d do. do. | 400 | 0 | 0 | | 41 | 4 |
| 3d do. do. | 63 | 3 | 24 | | 75 | 0 |
| 4th do. do. | 63 | 3 | 24 | | | |
| | | | | Collected | 171 | 11 |
| In the whole | 1218 | 1 | 24 | Lost | 40 | 6 |
| Sold | 200 | 0 | 00 | | | |
| | | | | I have | 131 | 5 |
| Remains | 1018 | 1 | 24 | | | |
-

- | | <i>Bu. p.</i> | | <i>Bu. p.</i> | | <i>Bu. p.</i> |
|----------------------------|---------------|---|---------------|-----|---------------|
| (5) Bought 400 3 of wheat, | 160 | 0 | of rye, | 150 | 2 of o |
| Sold 225 1 do. | 37 | 2 | do. | 78 | 3 do |
| Remaining | 175 | 2 | | 71 | 3 |
-

COMPOUND DIVISION.

EXAMPLES.

$$\begin{array}{r} \text{\textit{s}} \text{ cts.} \\ (3) \ 3) \overline{366 \ 18\frac{3}{4}} \\ \text{Ans. } 122 \ 6\frac{1}{4} \end{array} \quad \begin{array}{r} \text{\textit{s}} \text{ cts.} \\ (4) \ 6) \overline{384 \ 87\frac{1}{2}} \\ \text{Ans. } 64 \ 14\frac{1}{2} + 2 \end{array} \quad \begin{array}{r} \text{\textit{s}} \text{ cts.} \\ (5) \ 8) \overline{496 \ 75} \\ \text{Ans. } 62 \ 09\frac{1}{2} + 4 \end{array}$$

$$\begin{array}{r} \text{\textit{s}} \text{ cts.} \\ (6) \ 9) \overline{587 \ 68\frac{3}{4}} \\ \text{Ans. } 65 \ 29\frac{3}{4} + 4 \end{array} \quad \begin{array}{r} \text{\textit{s}} \text{ cts.} \\ (7) \ 11) \overline{976 \ 43\frac{3}{4}} \\ \text{Ans. } 88 \ 76\frac{1}{2} + 9 \end{array} \quad \begin{array}{r} \text{\textit{s}} \text{ cts.} \\ (8) \ 12) \overline{1979 \ 33\frac{1}{2}} \\ \text{Ans. } 164 \ 94\frac{1}{2} + 4 \end{array}$$

$$\begin{array}{r} \text{\textit{£}} \text{ s. d.} \\ (9) \ 3) \overline{560 \ 9 \ 7} \\ \text{Ans. } 186 \ 16 \ 6\frac{1}{4} + 1 \end{array} \quad \begin{array}{r} \text{\textit{£}} \text{ s. d.} \\ (10) \ 5) \overline{475 \ 19 \ 9\frac{3}{4}} \\ \text{Ans. } 95 \ 3 \ 11\frac{1}{2} + 1 \end{array}$$

$$\begin{array}{r} \text{\textit{£}} \text{ s. d.} \\ (11) \ 8) \overline{596 \ 15 \ 6\frac{1}{2}} \\ \text{Ans. } 74 \ 11 \ 11\frac{1}{4} + 2 \end{array} \quad \begin{array}{r} \text{\textit{£}} \text{ s. d.} \\ (12) \ 12) \overline{756 \ 4 \ 11\frac{3}{4}} \\ \text{Ans. } 63 \ 0 \ 4\frac{3}{4} + 11 \end{array}$$

$$\begin{array}{r} \text{Cwt. gr. lb.} \\ (13) \ 5) \overline{45 \ 3 \ 27} \\ \text{Ans. } 9 \ 0 \ 22 + 1 \end{array} \quad \begin{array}{r} \text{Cwt. gr. lb.} \\ (14) \ 9) \overline{10 \ 0 \ 15} \\ \text{Ans. } 1 \ 0 \ 14 + 1 \end{array} \quad \begin{array}{r} \text{Yds. gr. na.} \\ (15) \ 7) \overline{44 \ 1 \ 2} \\ \text{Ans. } 6 \ 1 \ 1 + 3 \end{array}$$

$$\begin{array}{r} \text{Yds. gr. na.} \\ (16) \ 11) \overline{56 \ 3 \ 3} \\ \text{Ans. } 5 \ 0 \ 2 + 9 \end{array} \quad \begin{array}{r} \text{M. fur. p.} \\ (17) \ 12) \overline{105 \ 5 \ 22} \\ \text{Ans. } 8 \ 6 \ 18 + 6 \end{array} \quad \begin{array}{r} \text{M. fur. p.} \\ (18) \ 6) \overline{45 \ 7 \ 18} \\ \text{Ans. } 7 \ 5 \ 9 + 4 \end{array}$$

When the divisor exceeds 12, but is the exact product of any two figures in the multiplication table.

$$\begin{array}{r} \text{\textit{s}} \text{ cts. m.} \\ (19) \ 6) \overline{45 \ 68 \ 5} \\ \text{6) } 7 \ 61 \ 0 + 5 \\ \text{Ans. } 1 \ 26 \ 8 + 2 \times 6 + 5 = 17 \end{array} \quad \begin{array}{r} \text{\textit{s}} \text{ cts. m.} \\ (20) \ 4) \overline{98 \ 77 \ 8} \\ \text{11) } 24 \ 69 \ 4 + 2 \\ \text{Rem. } 2 \ 24 \ 4 + 10 \times 4 + 2 = 42 \end{array}$$

$$(21) \begin{array}{r} \text{\$ cts. m.} \\ 12 \overline{) 77875} \end{array}$$

$$8 \overline{) 6489+7}$$

$$\text{Ans. } 0811 + 1 \times 12 + 7 = 19 \text{ Rem. } 11$$

$$(22) \begin{array}{r} \text{\$ cts.} \\ 12 \overline{) 28368\frac{3}{4}} \end{array}$$

$$9 \overline{) 2405\frac{1}{4} + 11}$$

$$\text{Ans. } 267\frac{1}{4} + 1 \times 12 + 11 =$$

$$(23) \begin{array}{r} \text{\$ cts. m.} \\ 12 \overline{) 496375} \end{array}$$

$$11 \overline{) 41364+7}$$

$$\text{Ans. } 3760 + 4 \times 12 + 7 = 55 \text{ Rem.}$$

$$(24) \begin{array}{r} \text{\pounds s. d.} \\ 4 \overline{) 87194\frac{1}{4}} \end{array}$$

$$8 \overline{) 211910+2}$$

$$\text{Ans. } 21411 + 6 \times 4 + 2 = \frac{25}{8} \text{ qrs.} = \frac{3}{4} + 2 \text{ Re}$$

$$(25) \begin{array}{r} \text{\pounds s. d.} \\ 3 \overline{) 5547\frac{3}{4}} \end{array}$$

$$7 \overline{) 1882\frac{1}{2} + 1}$$

$$\text{Ans. } 2137 + 6 \times 3 + 1 = 19 \text{ Rem. } 11$$

$$(26) \begin{array}{r} \text{\pounds s. d.} \\ 8 \overline{) 97156\frac{1}{4}} \end{array}$$

$$7 \overline{) 1245\frac{1}{4} + 1}$$

$$\text{Ans. } 11411 + 1 \times 8 + 1 =$$

$$(27) \begin{array}{r} \text{Hhd gal. qt.} \\ 7 \overline{) 44282} \end{array}$$

$$9 \overline{) 6220+2}$$

$$\text{Ans. } 0441 + 7 \times 7 + 2 = 51 \text{ Rem. } 11$$

$$(28) \begin{array}{r} \text{Hhd gal. qt.} \\ 12 \overline{) 150473} \end{array}$$

$$10 \overline{) 12351+11}$$

$$\text{Ans. } 1160 + 5 \times 12 + 11 =$$

COMPOUND DIVISION.

45

When the divisor exceeds 12, and is not the product of any two figures in the multiplication table.

$$\begin{array}{r} \text{\textit{s}} \text{ cts. } \text{\textit{s}} \text{ cts. m.} \\ (31) 78) 196 \text{ 75} (2 \text{ 52 2 Ans.} \\ \underline{156} \end{array}$$

$$\begin{array}{r} 78) 4075 (52 \text{ cts.} \\ \underline{3900} \end{array}$$

$$\begin{array}{r} \underline{175} \\ \underline{156} \end{array}$$

$$\begin{array}{r} 78) 190 (2 \text{ mills.} \\ \underline{156} \end{array}$$

$$\text{Rem. } 34$$

$$\begin{array}{r} \text{\textit{s}} \text{ cts. } \text{\textit{s}} \text{ cts. m.} \\ (32) 97) 496 \text{ 87} (5 \text{ 12 2} \\ \underline{485} \end{array}$$

$$\begin{array}{r} 97) 1187 (12 \text{ cts.} \\ \underline{97} \end{array}$$

$$\begin{array}{r} \underline{217} \\ \underline{194} \end{array}$$

$$\begin{array}{r} \underline{23} \\ \underline{10} \end{array}$$

$$\begin{array}{r} 97) 235 (2 \text{ mills.} \\ \underline{194} \end{array}$$

$$41 \text{ Rem.}$$

$$\begin{array}{r} \text{\textit{s}} \text{ cts. } \text{\textit{s}} \text{ cts.} \\ (38) 123) 376 \text{ 81} (3 \text{ 06} \frac{1}{2} \text{ Ans.} \\ \underline{369} \end{array}$$

$$\begin{array}{r} 123) 781 (6 \text{ cts.} \\ \underline{738} \end{array}$$

$$\begin{array}{r} \underline{43} \\ \underline{4} \end{array}$$

$$\begin{array}{r} 123) 173 (1 \\ \underline{123} \end{array}$$

$$50 \text{ Rem.}$$

$$\begin{array}{r} \text{\textit{£}} \text{ s. d. } \text{\textit{£}} \text{ s. d.} \\ (34) 87) 44 \text{ 7 6} (0 \text{ 10 2} \frac{1}{2} \text{ Ans.} \\ \underline{20} \end{array}$$

$$\begin{array}{r} 87) 887 (10 \text{ shillings.} \\ \underline{87} \end{array}$$

$$\begin{array}{r} \underline{17} \\ \underline{12} \end{array}$$

$$\begin{array}{r} 87) 210 (2 \text{ pence.} \\ \underline{174} \end{array}$$

$$\begin{array}{r} \underline{36} \\ \underline{4} \end{array}$$

$$\begin{array}{r} 87) 144 (1 \text{ farthing.} \\ \underline{87} \end{array}$$

$$57 \text{ Rem.}$$

COMPOUND DIVISION.

(35) $\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \quad \text{£} \quad \text{s.} \quad \text{d.} \\ 148 \overline{) 158} \quad 15 \quad 8\frac{1}{4}(1 \quad 1 \quad 2\frac{1}{4} \text{ nearly, Ans.} \\ \underline{148} \\ 8 \\ \underline{20} \\ 148 \overline{) 175}(1 \text{ shilling.} \\ \underline{148} \\ 27 \\ \underline{13} \\ 148 \overline{) 332}(2 \text{ pence.} \\ \underline{296} \\ 36 \\ \underline{4} \\ 147 \\ \underline{148} \end{array}$

PRACTICAL EXAMPLES.

(1) $\begin{array}{r} \text{£} \quad \text{cts.} \quad \text{m.} \\ 6 \overline{) 47 \ 87 \ 5} \\ \underline{4} \quad 7 \quad 97 \quad 9+1 \\ \underline{\hspace{1cm}} \end{array}$

(2) $\begin{array}{r} \text{£} \quad \text{cts.} \quad \text{£} \quad \text{cts.} \\ 112 \overline{) 64 \ 81\frac{1}{4}}(0 \ 57\frac{3}{4} \text{ Ans.} \\ \underline{100} \\ 112 \overline{) 6481}(57 \text{ cts.} \\ \underline{560} \\ 881 \\ \underline{784} \\ 97 \\ \underline{4} \\ 112 \overline{) 389}(3 \\ \underline{336} \\ 53 \text{ Rem.} \end{array}$

Ans. 1 99 4 + 3 × 6 + 1 = 19 Rem.

COMPOUND DIVISION

47

$ \begin{array}{r} \text{\$ cts. \$ cts. m.} \\ (3) \ 72 \overline{) 56 \ 25(0 \ 78 \ 1 \ \text{Ans.}} \\ \underline{100} \\ 72 \overline{) 5625(78 \ \text{cts.}} \\ \underline{504} \\ 585 \\ \underline{576} \\ 9 \\ \underline{10} \\ 72 \overline{) 90(1 \ \text{mill.}} \\ \underline{72} \\ 18 \ \text{Rem.} \end{array} $	$ \begin{array}{r} \text{\$ cts. \$ cts. m.} \\ (4) \ 63 \overline{) 125 \ 00(1 \ 98 \ 4 \ \text{Ans.}} \\ \underline{63} \\ 63 \overline{) 6200(98 \ \text{cts.}} \\ \underline{567} \\ 530 \\ \underline{504} \\ 26 \\ \underline{10} \\ 63 \overline{) 260(4 \ \text{mills.}} \\ \underline{252} \\ 8 \ \text{Rem.} \end{array} $
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$ \begin{array}{r} \text{\pounds s. d.} \\ (5) \ 4 \overline{) 18 \ 17 \ 6} \\ \text{Ans. } 4, \ 14 \ 4\frac{1}{2} \end{array} $	$ \begin{array}{r} \text{\pounds s. d.} \\ (7) \ 1000 \overline{) 576 \ 18 \ 9\frac{1}{2}(0 \ 11 \ 4\frac{1}{2} \ \text{Ans.}} \\ \underline{20} \\ 1000 \overline{) 11358(11 \ \text{shillings.}} \\ \underline{1000} \\ 1358 \\ \underline{1000} \\ 358 \\ \underline{12} \\ 1000 \overline{) 4305(4 \ \text{pence.}} \\ \underline{4000} \\ 305 \\ \underline{4} \\ 1000 \overline{) 1222(1 \ \text{farthing.}} \\ \underline{1000} \\ 222 \ \text{Rem.} \end{array} $
$ \begin{array}{r} \text{\$ cts. \$ cts.} \\ (6) \ 125 \overline{) 1875 \ 81\frac{1}{4}(15 \ 00\frac{1}{4} \ \text{Ans.}} \\ \underline{125} \\ 625 \\ \underline{625} \\ 125 \overline{) 00081(00 \ \text{cts.}} \\ \underline{4} \\ 125 \overline{) 325(2 \ \text{qrs.}} \\ \underline{250} \\ 75 \ \text{Rem.} \end{array} $	

REDUCTION.

<i>Gal. qt. pt. G. qt. pt.</i>	<i>C. qr. lb. C. qr. lb.</i>
(8) 89)150 2 1(1 2 1 Ans.	(9) 19)9 1 25(0 1 27 A
89	4
—	—
61	19)37(1 qr.
4	19
—	—
89)246(2 quarts.	18
178	28
—	—
68	149
2	38
—	—
89)137(1 pint.	19)529(27 lbs.
89	38
—	—
48 Rem.	149
—	133
	—
	16 Rem.
	—

REDUCTION.

FEDERAL MONEY.

EXAMPLES.

<i>\$</i>	<i>\$</i>	<i>\$</i>	<i>cts.</i>
(1) 10	(2) 25	(3) 387	(4) 25
100	100	100	4
—	—	—	—
Ans. 1000	Ans. 2500	Ans. 38700	Ans. 100 four
—	—	—	—

REDUCTION.

49

<p>(5) $\begin{array}{r} \text{cts.} \\ 50 \\ 2 \\ \hline \end{array}$ Ans. 100 halves.</p>	<p>(6) $\begin{array}{r} \text{cts.} \\ 150 \\ 3 \\ \hline \end{array}$ Ans. 450 thirds.</p>	<p>(7) $\begin{array}{r} \\$ \\ 50 \\ 100 \\ \hline 5000 \\ 2 \\ \hline \end{array}$ Ans. 10000 halves.</p>
<p>(8) $\begin{array}{r} \\$ \\ 25 \\ 100 \\ \hline 2500 \\ 3 \\ \hline \end{array}$ Ans. 7500 thirds.</p>	<p>(9) $\begin{array}{r} \\$ \\ 275 \\ 100 \\ \hline 27500 \\ 4 \\ \hline \end{array}$ Ans. 110000 qrs.</p>	<p>(10) $\begin{array}{r} \\$ \\ 10 \\ 10 \\ \hline \end{array}$ Ans. 100 dimes.</p>
<p>(11) $\begin{array}{r} \\$ \\ 220 \\ 10 \\ \hline 2200 \text{ dimes.} \\ 10 \\ \hline 22000 \text{ cts.} \\ 10 \\ \hline \text{Ans. 220000 mills.} \end{array}$</p>		

Note.—When more than one denomination is given to be reduced.

<p>(1) $\begin{array}{r} \\$ \text{ cts.} \\ 15 \ 15 \\ 100 \\ \hline \end{array}$ Ans. 1515 cts.</p>	<p>(2) $\begin{array}{r} \\$ \text{ cts.} \\ 2 \ 25 \\ 100 \\ \hline 225 \text{ cts.} \\ 4 \\ \hline \end{array}$ Ans. 900 4ths.</p>	<p>(3) $\begin{array}{r} \\$ \text{ cts.} \\ 17 \ 18\frac{3}{4} \\ 100 \\ \hline 1718 \text{ cts.} \\ 4 \\ \hline \end{array}$ Ans. 6875 4ths.</p>
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REDUCTION.

$$\begin{array}{r}
 \text{\$ cts.} \\
 (4) \quad 13 \ 27\frac{1}{2} \\
 \underline{100} \\
 1327 \\
 \underline{3}
 \end{array}$$

Ans. 3982 thirds.

$$\begin{array}{r}
 \text{\$ cts.} \\
 (5) \quad 426 \ 88\frac{1}{2} \\
 \underline{100} \\
 42688 \\
 \underline{2}
 \end{array}$$

Ans. 85377 halves.

ENGLISH MONEY.

$$\begin{array}{r}
 \text{\pounds} \\
 (2) \quad 364 \\
 \underline{20}
 \end{array}$$

Ans. 7280 s.

$$\begin{array}{r}
 \text{s.} \\
 (3) \quad 20 \\
 \underline{12}
 \end{array}$$

Ans. 240 d.

$$\begin{array}{r}
 \text{s.} \\
 (4) \quad 70 \\
 \underline{12}
 \end{array}$$

Ans. 840 d.

$$\begin{array}{r}
 \text{d.} \\
 (5) \quad 12 \\
 \underline{4}
 \end{array}$$

Ans. 48 qrs.

$$\begin{array}{r}
 \text{d.} \\
 (6) \quad 26 \\
 \underline{4}
 \end{array}$$

Ans. 104 qrs.

$$\begin{array}{r}
 \text{\pounds s. d.} \\
 (8) \quad 18 \ 12 \ 7 \\
 \underline{20}
 \end{array}$$

Ans. 4471 d.

$$\begin{array}{r}
 \text{\pounds s. d.} \\
 (9) \quad 105 \ 13 \ 9\frac{1}{2} \\
 \underline{20}
 \end{array}$$

Ans. 101462

$$\begin{array}{r}
 \text{\pounds s. d.} \\
 (10) \quad 36 \ 19 \ 7\frac{1}{2} \\
 \underline{20}
 \end{array}$$

Ans. 35503 qrs.

Cents to Pence.

$$\begin{array}{r}
 \text{cts.} \\
 (2) \quad 36975 \\
 \underline{9}
 \end{array}$$

10)332775

Ans. 33277 $\frac{1}{2}$ d.

$$\begin{array}{r}
 \text{cts.} \\
 (3) \quad 57697 \\
 \underline{9}
 \end{array}$$

10)519273

Ans. 51927 $\frac{1}{2}$ + d.

REDUCTION.

51

Pence to Cents.

$$\begin{array}{r} \text{(2)} \quad \begin{array}{r} d. \\ 4590 \\ 10 \end{array} \\ \hline \end{array}$$

$$9 \overline{)45900}$$

Ans. 5100 cts.

$$\begin{array}{r} \text{(3)} \quad \begin{array}{r} d. \\ 76975 \\ 10 \end{array} \\ \hline \end{array}$$

$$9 \overline{)769750}$$

Ans. 85527 cts. 7 m. + 7

AVOIRDUPOIS WEIGHT.

<i>Cwt.</i>	<i>qr.</i>	<i>lb.</i>	<i>oz.</i>
(2) 260	(3) 36	(4) 17	(5) 20
4	28	16	16
Ans. <u>1040</u> <i>qrs.</i>	<u>288</u>	<u>102</u>	<u>120</u>
	72	17	20

Ans. 1008 *lbs.* Ans. 272 *oz.* Ans. 320 *dr.*

<i>T. cwt.</i>	<i>qr.</i>	<i>Qr.</i>	<i>lb.</i>	<i>oz.</i>
(6) 5	12	(7) 2	25	10
20		28		
<u>112</u>		<u>21</u>		
4		6		

Ans. 450 *qrs.*

81 *lbs.*

16

486

82

1306 ounces.

16

7836

1306

Ans. 20896 drams.

REDUCTION.

APOTHECARIES' WEIGHT.

	$\frac{\text{℥}}{\text{ʒ}}$	$\frac{\text{℔}}{\text{℥}}$	$\frac{\text{℔}}{\text{℥}}$	$\frac{\text{℥}}{\text{ʒ}}$	$\frac{\text{ʒ}}{\text{℥}}$	$\frac{\text{℥}}{\text{ʒ}}$	$\frac{\text{ʒ}}{\text{℥}}$	$\frac{\text{℥}}{\text{ʒ}}$	$\frac{\text{ʒ}}{\text{℥}}$
(2)	72	(3)	10	(4)	15	9	3	9	2
	8		12		12				1
Ans.	576 drams.		120 ozs.		189 oz.				
			8		8				
			960 drs.		1516 drs.				
			3		3				
			2880 scrus.		4550 scrus.				
			20		20				
Ans.	57600 grs.	Ans.	91017 grs.						

CLOTH MEASURE.

	<i>Yds.</i>		<i>E. E.</i>		<i>E. Fl.</i>
(5)	36	(3)	20	(4)	16
	4		5		3
Ans.	144 qrs.	Ans.	100 qrs.		48 qrs.
					4
				Ans.	192 na.
	<i>E. Fl. qrs.</i>		<i>E. Fr. qr.</i>		<i>Yds. qrs.</i>
(5)	5 2	(6)	37 2	(7)	19 2
	3		5		4
Ans.	17 qrs.	Ans.	187 qrs.		78
					4
				Ans.	313 na.

REDUCTION.

53

DRY MEASURE.

<p>(2) $\begin{array}{r} Pe. \\ 32 \\ 8 \\ \hline \end{array}$</p> <p>Ans. 256 <i>qts.</i></p>	<p>(3) $\begin{array}{r} Bu. \\ 7 \\ 4 \\ \hline \end{array}$</p> <p>Ans. 28 <i>pe.</i></p>	<p>(4) $\begin{array}{r} Bu. \\ 12 \\ 4 \\ \hline \end{array}$</p> <p>48 8 <hr/>384 2 <hr/>Ans. 768 <i>pts.</i></p>
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<p>(5) $\begin{array}{r} Bu. \text{ } pe. \text{ } qt. \\ 14 \text{ } 0 \text{ } 3 \\ 4 \\ \hline 56 \\ 8 \\ \hline \end{array}$</p> <p>Ans. 451 <i>qts.</i></p>	<p>(6) $\begin{array}{r} Bu. \text{ } pe. \text{ } qt. \text{ } pt. \\ 24 \text{ } 1 \text{ } 2 \text{ } 1 \\ 4 \\ \hline 97 \\ 8 \\ \hline 778 \\ 2 \\ \hline \end{array}$</p> <p>Ans. 1557 <i>pts.</i></p>
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LAND MEASURE.

<p>(2) $\begin{array}{r} A. \\ 132 \\ 4 \\ \hline 528 \\ 40 \\ \hline \end{array}$</p> <p>Ans. 21120 <i>p.</i></p>	<p>(3) $\begin{array}{r} A. \text{ } R. \text{ } P. \\ 54 \text{ } 3 \text{ } 23 \\ 4 \\ \hline 219 \\ 40 \\ \hline \end{array}$</p> <p>Ans. 8783</p>
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SQUARE MEASURE.

<i>Sq. yds.</i>	<i>Sq. yds. s. ft. s. in.</i>
(2) 120	(3) 29 2 102
9	9
<hr/>	<hr/>
1080	263
144	144
<hr/>	<hr/>
4320	1154
4320	1052
1080	263
<hr/>	<hr/>
Ans. 155520 sq. in.	Ans. 37974 sq. in.

LIQUID MEASURE.

<i>Gals.</i>	<i>Hhds.</i>	<i>Gals.</i>	<i>Tuns.</i>
(2) 28	(3) 5	(4) 110	(5) 6
4	63	4	4
<hr/>	<hr/>	<hr/>	<hr/>
Ans. 112 qts.	Ans. 315 gals.	440	24
<hr/>	<hr/>	2	63
		<hr/>	<hr/>
		Ans. 880 pts.	72
			144
<hr/>			<hr/>
<i>Hhds. gals. qts.</i>	<i>Gals. qts.</i>		
(6) 7 41 2	(7) 47 2		1512
63	4		4
<hr/>	<hr/>		<hr/>
22	190		6048
46	2		2
<hr/>	<hr/>		<hr/>
482	Ans. 380 pts.	Ans. 12096 pts.	
4	<hr/>	<hr/>	
<hr/>			
Ans. 1930 qts.			

REDUCTION.

55

<i>Hhs. gals. qts.</i>				<i>Tens hds. gals.</i>				<i>Ten. hds. gal. qt. pt.</i>			
(8)	4	0	3	(9)	19	0	27	(10)	5	1	15
	63				4				4		
	<u>252</u>				<u>76</u>	<i>hds.</i>			<u>21</u>		
	4				63				63		
	<u>1011</u>				<u>255</u>				<u>78</u>		
	2				456				126		
	<u>Ans. 2022</u>	<i>pts.</i>			<u>4815</u>				<u>1338</u>		
					4				4		
					<u>Ans. 19260</u>	<i>qts.</i>			<u>5353</u>		
									2		
									<u>Ans. 10707</u>	<i>pts.</i>	

LONG MEASURE.

<i>Yds.</i>		<i>Po.</i>		<i>Fur.</i>		<i>Miles.</i>	
(2)	48	(3)	27	(4)	18	(5)	34
	3		5½		40		8
	<u>Ans. 144</u>		<u>135</u>		<u>Ans. 720</u>	<i>po.</i>	<u>Ans. 272</u>
			13½				<i>fur.</i>
			<u>Ans. 148½</u>				<i>yds.</i>
	<i>L.</i>		<i>M.</i>		<i>M.</i>		
(6)	108	(7)	17	(8)	20		
	3		320		1760		
	<u>Ans. 324</u>		<u>340</u>		<u>Ans. 35200</u>	<i>yds.</i>	
			51				
			<u>Ans. 5440</u>				<i>po.</i>

REDUCTION.

	<i>L.</i>	<i>Ft. in.</i>		<i>Yds. ft.</i>
(9)	6	(10) 14 9	(11)	37 1
	3	12		3

18
8

Ans. 177 in.

Ans. 112 ft.

144
40

Fur. po.
(12) 112 29
40

5760
5½

½)4509
5½

28800
2880

22545
2254½

31680
3

Ans. 24799½ yds.

95040
12

L. m. fur. po. yds. ft. in.
(14) 2 1 3 16 3 2 10
3

Ans. 1140480 in.

M. fur. po.
(13) 450 6 32
8

3606
40

½)2376
5½

Ans. 144272 po.

11883
1188

13071
3

39215
12

Ans. 470590 in.

REDUCTION.

57

TROY WEIGHT.

<i>oz.</i>	<i>lb.</i>	<i>oz. dwt.</i>	<i>lb. oz. dwt. gr.</i>
(2) 116 20	(3) 25 12	(4) 29 16 20	(5) 19 11 14 21 12
Ans. 2320 dwt.	300 20	Ans. 596 dwt.	239 20
	6000 24		4794 24
	24000 12000		19197 9588
	Ans. 144000 gr.		Ans. 115077 gr.

TIME.

<i>Min.</i>	<i>hrs.</i>	<i> yrs.</i>
(1) 30 60	(2) 12 60	(3) 12 12
Ans. 1800 s.	Ans. 720 m.	Ans. 144 m.
	<i>d. hr. min.</i> (4) 3 5 29 24 17 6 77 60 Ans. 4649 min.	

MOTION, OR CIRCLE MEASURE.

	[°]	<i>Sig.</i>		[°]	<i>Sig.</i>		[°]	<i>'</i>	<i>"</i>
(1)	24	(2)	4	(3)	11 12	(4)	4 3 18 27		
	60		30		30		30		
	<u> </u>		<u> </u>		<u> </u>		<u> </u>		
Ans.	1440'		120	Ans.	342		123		
	<u> </u>		60		<u> </u>		60		
			<u> </u>				<u> </u>		
			7200				7398		
			60				60		
			<u> </u>				<u> </u>		
			Ans. 432000				Ans. 443907"		
			<u> </u>				<u> </u>		

PROMISCUOUS EXAMPLES.

	<i>£</i>	<i>Fur.</i>	<i>Days.</i>	<i>H. cts.</i>
(1)	35	(2) 8)98	(3) 7)365	(4) 2)84
	100			
	<u> </u>			
Ans.	12 m. 2 fur.	Ans.	52 w. 1 d.	Ans. 42 cts.
Ans.	3500 cts.			
	<u> </u>			
	<i>Tons cwt.</i>	<i>R.</i>	<i>S.</i>	<i>P.</i>
(5)	8 15	(6) 63	(7) 2 0)15 7	(8) 4)175
	20	40		
	<u> </u>			
Ans.	175 cwt.	Ans.	£7 17 s.	Ans. 43 bu. 3 pe.
	<u> </u>			
	<i>cts.</i>	<i>Pts.</i>	<i>Sec.</i>	<i>Hhd. gal.</i>
(9)	100)76 42	(10) 2)103	(11) 8 0)72 0	(12) 7 33
				63
Ans.	£76 42 cts	Ans.	51 qts. 1 pt.	Ans. 12 min.
	<u> </u>			24
				45
				<u> </u>
				Ans. 474 gal.
				<u> </u>

REDUCTION.

59

<i>Qrs.</i>	<i>Dwt.</i>	<i>S.</i>
(13) 5)100	(14) 2 0 10 8	(15) 2 0 25 0
Ans. 20 <i>E. E.</i>	Ans. 5 <i>oz. 8 dwt.</i>	Ans. £12 10 <i>s.</i>

	<i>s. d.</i>	<i>Days.</i>	<i>Qrs.</i>
(16) 3	(17) 8 8	(18) 7)203	(19) 16
7	12		4
3		Ans. 29 <i>w.</i>	
Ans. 21 <i>9</i>	Ans. 104 <i>d.</i>		Ans. 64 <i>na.</i>

<i>drs.</i>	<i>S.</i>	<i>Tuns.</i>
(20) 16)74(4 <i>oz.</i> 10 <i>drs.</i> Ans.	(21) 13	(22) 20
64	4	20
10	Ans. threepences 52	Ans. 400 <i>cwt.</i>

<i>Qrs.</i>	<i>Gal. qt. pt.</i>	<i>M. fur.</i>
(23) 5)81	(24) 21 3 1	(25) 3 1
	4	8
Ans. 16 <i>E. Fr.</i> 1 <i>qr.</i>	87	Ans. 25 <i>fur.</i>
	2	
	Ans. 175 <i>pts.</i>	

<i>Cts.</i>	<i>Days.</i>	<i>Cts.</i>
(26) 1 00 12 35	(27) 3	(28) 121
	24	4
Ans. \$12 35 <i>cts.</i>	72	Ans. 484 <i>qrs.</i>
	60	
	Ans. 4320 <i>m.</i>	

REDUCTION.

	<i>lbs.</i>	<i>Qrs.</i>	<i>Dwt.</i>
(29)	13	(30) 3)154	(31) 2 0)246 1
	16		
	—	Ans. 51 <i>E. Fl.</i> 1 <i>qr.</i> 12)	123 + 1 <i>dwt.</i>
	78	—	—
	13		Ans. 10 <i>lb.</i> 3 <i>oz.</i> 1 <i>dwt.</i>
	—		—

208

16

1248

208

Ans. 3328 *drs.*

	<i>Yd. qr. na.</i>	<i>Gals.</i>
(32)	12 2 1	(33) 63)584621(4)9279
	4	567
	—	—
	50	Ans. 2319 <i>t.</i> 3 <i>hds.</i> 44 <i>g.</i>
	4	176
	—	126

Ans. 201 *na.*

502

441

	<i>lbs. oz.</i>
(34)	725 6
	16

611

567

44 *gals.*

4356

725

11606

16

69636

11606

Ans. 185696 *drs.*

	<i>lbs.</i>	<i>qrs.</i>
(35)	28)27552(4)984	
	252	
	—	246 <i>cwt.</i> Ans.

235

224

112

112

SINGLE RULE OF THREE.

61

\pounds	s.	d.	Days.	\pounds	s.	d.
(36)	5	4	6 $\frac{1}{4}$	(37)	7	763
20						20
104			Ans. 109 w.			1710
12						12
1254						Ans. 20527 d.
4						

Ans. 5017 far.

	Gr.		Qrs.
(39)	2 0)122 0	(40)	5 27
	3)61		Ans. 5 E. E. 2 qrs.
	Ans: 203 19		

	Pts.		per.
(41)	2)1357	(42)	4 0)865 4
	8)678+1 pt.		4)216 +14 per.
	4)84+6 qts.		Ans. 54 a. 0 r. 14 p.
	Ans. 21 bu. 0 p. 6 qts. 1 pt.		

SINGLE RULE OF THREE.

EXAMPLES.

- lbs. lbs. cts. cts.*
- (3) State the question thus: As 2 : 8 :: 50 : 200 Ans.
For $50 \times 8 = 400 \div 2 = 200$ cts.

lb. lbs. cts. cts.

(4) As 1 : 5 :: 12 : 60

For $12 \times 5 = 60 \div 1 = 60$ cts. Ans.

yds. yd. cts. cts.

(5) As 10 : 1 :: 550 : 55

For $550 \times 1 = 550$ which $\div 10 = 55$ cts. Ans.

lbs. lbs. cts. \$ cts.

(6) As 7 : 122 :: $87\frac{1}{2}$: 15 25

For $87\frac{1}{2} \times 122 = 10675$ which $\div 7 = \$15$ 25 cts. Ans.

bu. bu. cts. \$ cts.

(7) As 1 : 209 :: 72 : 150 48

For $72 \times 209 = 15048$ which $\div 1 = \$150$ 48 cts. Ans.

lbs. lb. cts. cts.

(8) As 5 : 1 :: 55 : 11

For $55 \times 1 = 55$ which $\div 5 = 11$ cts. Ans.

yd. yds. \$ cts. \$ cts.

(9) As 1 : 18 :: 4 25 : 76 50

For $425 \times 18 = 7650$ which $\div 1 = \$76$ 50 cts. Ans.

lbs. lb. \$ cts. cts.*

(10) As 76 : 1 :: 24 32 : 32

For $2432 \times 1 = 2432$ which $\div 76 = 32$ cts. Ans.

bu. bu. \$ cts. cts. m.

(11) As 8 : 1 :: 3 94 : 49 2 + 4

For $394 \times 1 = 394$ which $\div 8 = 49$ cts. 2 m. + 4 Ans.

lb. lbs. cts. \$ cts.

(12) As 1 : 57 :: $7\frac{1}{2}$: 4 27 $\frac{1}{2}$

For $7\frac{1}{2} \times 57 = 427\frac{1}{2}$ which $\div 1 = \$4$ 27 $\frac{1}{2}$ cts. Ans.

bu. bu. cts. \$ cts.

(13) As 1 : 243 :: 45 : 109 35

For $45 \times 243 = 10935$ which $\div 1 = \$109$ 35 cts. Ans.

lb. lbs. \$ cts. \$ cts.

(14) As 1 : 147 :: 1 12 $\frac{1}{2}$: 165 37 $\frac{1}{2}$ Ans.

For $112\frac{1}{2} \times 147 = 16537\frac{1}{2}$ which $\div 1 = \$165$ 37 $\frac{1}{2}$ cts.

lb. lbs. cts. \$ cts.

(15) As 1 : 869 :: $4\frac{1}{2}$: 39 10 $\frac{1}{2}$

For $4\frac{1}{2} \times 869 = 3910\frac{1}{2}$ which $\div 1 = \$39$ 10 $\frac{1}{2}$ cts. Ans.

SINGLE RULE OF THREE.

63

- (16) *yds. yd. \$ cts. \$ cts.*
 As 24 : 1 :: 125 24 : 5 21 + 20 Ans.
 For $12524 \times 1 = 12524$ which $\div 24 = \$5\ 21\ cts. + 20$
C. lb. \$ cts. cts. m.
- (17) As 1 : 1 :: 11 50 : 10 2 + 76
lbs. lb. \$ cts. cts. m.
 Or, as 112 : 1 :: 11 50 : 10 2 + 76 Ans.
 For $1150 \times 1 = 1150$ which $\div 112 = 10\ cts. 2\ m. + 76$
lb. lbs. cts. \$ cts.
- (18) As 1 : 218 :: 7 : 15 26
 For $7 \times 218 = 1526$ which $\div 1 = \$15\ 26\ cts.$ Ans.
bu. bu. £ s. s. d. s.
- (19) As 57 : 1 :: 30 10 : 10 8 $\frac{1}{2}$ + 39
bu. bu. s. s. d.
 Or, as 57 : 1 :: 610 : 10 8 $\frac{1}{2}$ +
 For $610 \times 1 = 610$ which $\div 57 = 10\ s. 8\frac{1}{2}\ d. + 39$ Ans.
oz. lbs. oz. cts. \$ cts.
- (20) As 1 : 3 5 :: 72 : 29 52
oz. oz. cts. \$ cts.
 Or, as 1 : 41 :: 72 : 29 52.
 For $72 \times 41 = 2952$ which $\div 1 = \$29\ 52\ cts.$ Ans.
lb. lbs. cts. \$ cts.
- (21) As 1 : 135 :: 10 : 13 50
 For $10 \times 135 = 1350$ which $\div 1 = \$13\ 50\ cts.$ Ans.
C. T. C. £ s. d. £ s. d.
- (22) As 2 : 15 3 :: 7 12 6 : 1155 3 9
C. C. d. £ s. d.
 Or, as 2 : 303 :: 1830 : 1155 3 9
 For $1830 \times 303 = 554490$ which $\div 2 = 277245\ d. =$
 £1155 3s. 9d. Ans.
s. d. £ s. d. gal. gals.
- (23) As 4 10 : 54 7 6 :: 1 : 225
d. d. gal. gals.
 Or, as 58 : 13050 :: 1 : 225
 For $1 \times 13050 = 13050$ which $\div 58 = 225\ gals.$ Ans.
w. w. cts. \$ cts.
- (24) As 1 : 52 :: 250 : 130, 00
 For $250 \times 52 = 13000$ which $\div 1 = \$130\ 00\ cts.$ Ans.

SINGLE RULE OF THREE.

- A. A. R. P. \$ cts. \$ cts.*
 (25) As 1 : 34 1 17 :: 42 25 : 1451 55+25
P. P. \$ cts. \$ cts.
 Or, as 160 : 5497 :: 42 25 : 1451 55+25
 For $4225 \times 5497 = 23224825$ which $\div 160 = \$1451$
 55 cts. + 25 Ans.
- gals. gal. £ s. s.*
 (26) As 131 : 1 :: 65 10 : 10
gals. gal. s. s.
 Or, as 131 : 1 :: 1310 : 10
 For $1310 \times 1 = 1310$ which $\div 131 = 10$ s. Ans.
- \$ \$ T. T. hhd. gal. qt. pt.*
 (27) As 754 : 1754 :: 1 : 2 1 19 0 1
 For $1 \times 1754 = 1754$ which $\div 754 = 2$ T. 1 hhd. 19
 gal. 0 qt. 1 pt. Ans.
- s. d. £ s. yds. yds.*
 (28) As 18 8 : 36 16 :: 7 : 276
d. d. yds. yds.
 Or, as 224 : 8832 :: 7 : 276
 For $8832 \times 7 = 61824$ which $\div 224 = 276$ yds. Ans.
- lb. cwt. qrs. lbs. cts. \$ cts. m.*
 (29) As 1 : 5 2 17 :: $9\frac{1}{2}$: 60 13 5
lb. lbs. cts. \$ cts. m.
 Or, as 1 : 633 :: $9\frac{1}{2}$: 60 13 5
 For $9\frac{1}{2} \times 633 = 6013\frac{1}{2}$ which $\div 1 = \$60$ 13 cts. 5 m. Ans.
- cts. \$ lb. lbs. oz. dr.*
 (30) As 114 : 354 :: 1 : 310 8 6+84
 For $1 \times 35400 = 35400$ which $\div 114 = 310$ lbs. 8 oz.
 6 dr. + 84 Ans.
- £ s. £ s. skeins. skeins.*
 (31) As 2 10 : 105 3 :: 100 : 4206
s. s. skeins. skeins.
 Or, as 50 : 2103 :: 100 : 4206
 For $100 \times 2103 = 210300$ which $\div 50 = 4206$ sk. Ans.
- yds. yd. \$ cts. \$ cts. m.*
 (32) As 39 : 1 :: 350 38 : 8 98 4+ Ans.
 For $35038 \times 1 = 35038$ which $\div 39 = \$8$ 98 cts. 4 m.

$$(33) \begin{array}{ccccccc} & \text{gals.} & \text{qts.} & \text{gals.} & \text{qt.} & \text{pt.} & \text{gals.} & \text{qts.} & \text{pt.} \\ 61\frac{1}{2} \text{ gals.} & = & 61 & 2 & + & 62 & 1 & 1 = & 123 & 3 & 1 \end{array}$$

$$\text{Then as } \begin{array}{ccccccc} \text{pt.} & \text{gals.} & \text{qts.} & \text{pt.} & \text{cts.} & \$ & \text{cts.} \\ 1 & : & 123 & 3 & 1 : : & 37\frac{1}{2} & : & 371 & 62\frac{1}{2} \end{array}$$

$$\text{Or, as } \begin{array}{ccccccc} \text{pt} & \text{pts.} & \text{cts.} & \$ & \text{cts.} \\ 1 & : & 991 : : & 37\frac{1}{2} & : & 371 & 62\frac{1}{2} \end{array}$$

$$\text{For } 37\frac{1}{2} \times 991 = 37162\frac{1}{2} \text{ which } \div 1 = \$371 62\frac{1}{2} \text{ cts. Ans.}$$

$$\text{bu. bu. bu.}$$

$$(34) 75 + 87 = 162$$

$$\text{bu. bu. cts. } \$ \text{ cts.}$$

$$\text{Then as } 1 : 162 : : 52 : 84 \text{ } 24$$

$$\text{For } 52 \times 162 = 8424 \text{ which } \div 1 = \$84 \text{ } 24 \text{ cts. Ans.}$$

$$(35) 1 \text{ year equals } 365 \text{ days.}$$

$$\text{day. days. cts. } \$ \text{ cts.}$$

$$\text{Then as } 1 : 365 : : 187\frac{1}{2} : 684 \text{ } 37\frac{1}{2}$$

$$\text{For } 187\frac{1}{2} \times 365 = 68437\frac{1}{2} \text{ which } \div 1 = \$684 \text{ } 37\frac{1}{2} \text{ cts.}$$

$$\text{the sum he spends in a year; his income yearly is } \$1022 - \$684 \text{ } 37\frac{1}{2} \text{ cts.} = \$337 \text{ } 62\frac{1}{2} \text{ cts. Ans.}$$

$$\text{cwt. cwt. qrs. lb. } \$ \text{ cts. } \$ \text{ cts.}$$

$$(36) \text{ As } 1 : 4 \text{ } 3 \text{ } 24 : : 2 \text{ } 10 : 10 \text{ } 42\frac{1}{2}$$

$$\text{lbs. lbs. cts. } \$ \text{ cts.}$$

$$\text{Or, as } 112 : 556 : : 210 : 10 \text{ } 42\frac{1}{2} \text{ price of stove.}$$

$$\text{For } 210 \times 556 = 110760 \text{ which } \div 112 = \$10 \text{ } 42\frac{1}{2} \text{ cts. price of stove.}$$

$$\text{Then } 27 \text{ lbs. } \times 18\frac{3}{4} \text{ cts.} = \$5 \text{ } 06\frac{1}{4} \text{ cts. amount of pipe, and } 50 \text{ cts. } \times 2 = \$1.00 \text{ price of 2 elbows.}$$

$$+ \$10 \text{ } 42\frac{1}{2} \text{ cts. price of stove.}$$

$$+ \$5 \text{ } 06\frac{1}{4} \text{ cts. do. pipe.}$$

$$+ \$1 \text{ } 00 \text{ cts. do. elbows.}$$

$$\underline{\underline{\$16 \text{ } 48\frac{3}{4} \text{ Ans.}}}$$

$$(37) 14 \text{ pair } \times 2 = 28 \text{ single shutters, which } \times 8\frac{1}{2} = 238 \text{ whole number of sheets used.}$$

$$\text{sheet sheets. cts. } \$ \text{ cts.}$$

$$\text{Then as } 1 : 238 : : 11\frac{1}{2} : 27 \text{ } 37$$

$$\text{For } 238 \times 11\frac{1}{2} = 2737 \text{ which } \div 1 = \$27 \text{ } 37 \text{ cts. Ans.}$$

INVERSE PROPORTION.

- (42) $m. \quad m. \quad d. \quad d.$
 As 12 : 6 :: 18 : 9
 For $18 \times 6 = 108$ which $\div 12 = 9$ days. Ans.
- (43) $m. \quad m. \quad d. \quad d. \quad h.$
 As 18 : 12 :: 20 : 13 4
 For $20 \times 12 = 240$ which $\div 18 = 13$ days 4 hours. Ans.
- (44) $d. \quad d. \quad m. \quad m.$
 As 4 : 24 :: 8 : 48
 For $8 \times 24 = 192$ which $\div 8 = 48$ men. Ans.
- (45) $m. \quad m. \quad d. \quad d.$
 As 48 : 12 :: 24 : 6
 For $24 \times 12 = 288$ which $\div 48 = 6$ days. Ans.
- (46) $h. \quad h. \quad d. \quad d. \quad h.$
 As 15 : 11 :: 5 : 3 10
 For $5 \times 11 = 55$ which $\div 15 = 3$ days 10 hours. Ans.
- (47) $ft. \quad in. \quad ft. \quad in. \quad ft. \quad yds. \quad ft. \quad in.$
 As 2 3 : 30 6 :: 48 : 216 2 8
 $in. \quad in. \quad ft. \quad yds. \quad ft. \quad in.$
 Or, as 27 : 366 :: 48 : 216 2 8
 For $48 \times 366 = 17568$ which $\div 27 = 650\frac{1}{3}$ ft. = 216 yds. 2 ft. 8 in. Ans.
- (48) $d. \quad d. \quad m. \quad m.$
 As 50 : 100 :: 14 : 28
 For $14 \times 100 = 1400$ which $\div 50 = 28$ men. Ans.

PROMISCUOUS EXAMPLES.

- (49) $Cwt. \quad Cwt. \quad qrs. \quad lbs. \quad \$ \quad cts.$
 As 1 : 18 3 19 :: 11 37 $\frac{1}{2}$
 $Cwt. \quad qrs. \quad lbs. \quad lbs.$
 For 18 3 19 = 2119 which $\times 1137\frac{1}{2} = 2410362\frac{1}{2}$ the
 divisor; which $\div 1$ cwt., that is 112 lbs. = \$215
 21 + 10 $\frac{1}{2}$ Ans.
- (50) $\$ \quad \$ \quad \$$
 730 — 22 = 708
 $yds. \quad yd. \quad \$ \quad \$ \quad cts. \quad m.$
 Then as 156 : 1 :: 708 : 4 53 8 +
 For $708 \times 1 = 708$ which $\div 156 = \$4$ 53 cts. 8 m. + 72

- (51) To find the prime cost.

C. C. qrs. lbs. \$ cts. \$ cts. m.

1 : 19 2 17 :: 9 31½ : 183 00 7+

lbs. lbs. \$ cts. \$ cts. m.

Or, as 112 : 2201 :: 9 31½ : 183 00 7+

For $931\frac{1}{4} \times 2201 = 2049681\frac{1}{4}$ which $\div 112 = \$183$
00 cts. 7 m. + Ans.

To find the sum it sold for.

lbs. lbs. \$ cts. \$ cts. m.

As 112 : 2201 :: 10 65 : 209 29 1+

For $1065 \times 2201 = 2344065$ which $\div 112 = \$209$ 29 cts. 1 m. Ans.

To find the gain. It sold for \$209 29 cts. 1 m.—
\$183 00 cts. 7 m. = \$26 28 cts. 4 m.

yds. yd. \$ cts. cts. m.

- (52) As 47 :-1 :: 14 75 : 31 3+

For $1475 \times 1 = 1475$ which $\div 47 = 31$ cts. 3 m. + Ans.

- (53) 3 qrs. wide : 1½ wide :: 3½ long : 6½ long.

For $3\frac{3}{4} = 15$ qrs. and $1\frac{1}{2} = 5$ qrs. therefore $15 \times 5 = 75$ which $\div 3 = 25$ qrs. = the quantity of holland requisite for each suit, and this 25 qrs. $\times 354$ suits or men = 8850 qrs. which $\div 4 = 2212\frac{1}{2}$ yds. Ans.

- (54) First 25 ft. : 250 ft. :: 33 ft. 10 in. : 338 ft. 4 in.

For $33 \text{ ft. } 10 \times 12 = 406 \text{ in.}$ $\times 250 = 101500$ which $\div 25 = 4060 \text{ in.} = 338 \text{ ft. } 4 \text{ in.}$ the length of the shadow of the tower. Then as the shadow is 18 ft. 6 in. longer than the width of the river, consequently $338 \text{ ft. } 4 \text{ in.} - 18 \text{ ft. } 6 \text{ in.} = 319 \text{ ft. } 10 \text{ in.}$ the width of the river. Ans.

- (55) First, 24 hrs. : 360 deg. :: 1 m. : 17 m. 3 fur. 1st Ans.

For $360 \times 69\frac{1}{2} \times 1 = 25020$ and $24 \text{ hrs.} \times 60 = 1440$; therefore $25020 \div 1440 = 17 \text{ m. } 3 \text{ fur.}$

Again, 24 hrs. : 360 deg. :: 1 m. : 11 m. 4 fur. = the velocity of the earth in lat. 40 deg.

For $360 \times 46 = 16560 \div 1440 = 11 \text{ m. } 4 \text{ fur.}$

Then, 17 m. 3 fur. — 11 m. 4 fur. = 5 m. 7 fur. 2d Ans.

DOUBLE RULE OF THREE.

EXAMPLES.

- (2) Thus $3 m. : 8 m. \} :: 32 A. : 170 A. 2 R. 26 P. 20 yds. +$
 $12 d. : 24 d. \}$
 For $8 \times 24 \times 32 = 6144$ the dividend.
 And $3 \times 12 = 36$ the divisor.
 Then $6144 \div 36 = 170 A. 2 R. 26 P. 20 yds. +$ Ans.
- (3) Thus $10 ox. : 20 ox. \} :: 2 A. : 6 A.$
 $18 d. : 27 d. \}$
 For $20 \times 27 \times 2 = 1080$ the dividend.
 And $18 \times 10 = 180$ the divisor.
 Then $1080 \div 180 = 6 A.$ Ans.
- (4) Thus $9 m. : 24 m. \} :: 36 lbs. : 48 lbs.$
 $10 d. : 5 d. \}$
 For $24 \times 5 \times 36 = 4320$ the dividend.
 And $9 \times 10 = 90$ the divisor.
 Then $4320 \div 90 = 48 lbs.$ Ans.
- (5) Thus $\$100 : \$335 \} :: \$6 : \$30 15 cts.$
 $12 m. : 18 m. \}$
 For $335 \times 18 \times 6 = 36180$ the dividend.
 And $100 \times 12 = 1200$ the divisor.
 Then $36180 \div 1200 = \$30 15 cts.$ Ans.
- (6) Thus $20 m. : 46 m. \} :: \$56 31 \frac{1}{4} cts. : \$828 92 cts.$
 $5 d. : 32 d. \}$
 For $46 \times 32 \times 5631 \frac{1}{4} = 8289200$ the dividend.
 And $20 \times 5 = 100$ the divisor.
 Then $8289200 \div 100 = \$828 92 cts.$ Ans.
- (7) Thus $8 m. : 12 m. \} :: 120 pairs. : 540 pairs.$
 $30 d. : 90 d. \}$
 For $12 \times 90 \times 120 = 129600$ the dividend.
 And $8 \times 30 = 240$ the divisor.
 Then $129600 \div 240 = 540 pairs.$ Ans.
- (8) Thus $12 p. : 38 p. \} :: 37 lbs. : 468 lbs. 10 \frac{1}{2} oz.$
 $4 d. : 16 d. \}$
 For $38 \times 16 \times 37 = 22496$ the dividend.
 And $12 \times 4 = 48$ the divisor.
 Then $22496 \div 48 = 468 lbs. 10 \frac{1}{2} oz.$ Ans.

- (9) Thus $8h. : 12h. \} :: 5pts. : 13pts.+$
 $4E. : 7E. \}$

For $12 \times 7 \times 5 = 420$ the dividend.

And $8 \times 4 = 32$ the divisor.

Then $420 \div 32 = 13 +$ Ans.

- (10) Thus $7\frac{1}{2}yds. : 24yds. 2qrs. \} :: \$17\ 37\frac{1}{2}cts. : \$$
 $3qrs. : 7qrs. \} \quad 43ct$

For $24yds. 2qrs. = 98qrs.$ And $7\frac{1}{2}yds. = 30qrs.$

Then $98 \times 7 \times 1737\frac{1}{2} = 1191925$ the dividend.

And $30 \times 3 = 90$ the divisor.

Then $1191925 \div 90 = \$132\ 43cts. +$ Ans.

- (11) Thus $20h. : 62h. \} :: 12bu. : 60bu. 3pe. 3qts.$
 $22d. : 36d. \}$

For $62 \times 36 \times 12 = 26784$ the dividend.

And $20 \times 22 = 440$ the divisor.

Then $26784 \div 440 = 60bu. 3pe. 3qts. 1pt. + 376 A$

- (12) Thus $\$100 : \$563 \} :: \$8 : \$152\ 01ct$
 $12m. : 54m. \}$

For $563 \times 18 \times 6 = 182412$ the dividend.

And $100 \times 12 = 1200$ the divisor.

Then $182412 \div 1200 = \$152\ 01ct$ Ans.

- (13) Thus $8h. : 20h. \} :: 6T. : 36T. 8cwt. 2qrs. 8lb$
 $7m. : 17m. \}$

For $20 \times 17 \times 6 = 2040$ the dividend.

And $8 \times 7 = 56$ the divisor.

Then $2040 \div 56 = 36T. 8cwt. 2qrs. 8lbs.$ Ans.

- (14) Thus $2yds. : 50yds. \} :: 1lb. : 15lbs.$
 $5qrs. : 3qrs. \}$

For $50 \times 3 \times 1 = 150$ the dividend.

And $2 \times 5 = 10$ the divisor.

Then $150 \div 10 = 15lbs.$ Ans.

- (15) Thus $\$21 : \$96 \} :: 7rs. : 3rs.$
 $32d. : 3d. \}$

For $96 \times 3 \times 7 = 2016$ the dividend.

And $21 \times 32 = 672$ the divisor.

Then $2016 \div 672 = 3.$ Ans.

- (16) Thus $4m. : 12m. \} :: \$100 : \360
 $\$7\frac{1}{2} : \$9 \}$
 For $12 \times 9 \times 100 = 10800$ the dividend.
 And $4 \times 7\frac{1}{2} = 30$ the divisor.
 Then $10800 \div 30 = \$360$. Ans.
- (17) Inversely thus $40ft. \} : \{ 20ft. \}$
 $54ft. \} : \{ 54ft. \}$
 $72m. : 27m. \} :: 10d. : 1d. 10\frac{1}{2}hrs.$
 For $20 \times 54 \times 27 \times 10 = 291600$ the dividend.
 And $40 \times 54 \times 72 = 155520$ the divisor.
 Then $291600 \div 155520 = 1d. 10\frac{1}{2}hrs.$ Ans.
- (18) Thus $305m. : 1056m. \}$
 $12\frac{1}{2}h. : 14h. \} :: 30d. : 116d. + 2540$
 For $1056 \times 14 \times 30 = 443520$ the dividend.
 And $305 \times 12\frac{1}{2} = 3812\frac{1}{2}$ the divisor.
 Then $443520 \div 3812\frac{1}{2} = 116d. +$ Ans.
- (19) Thus $\$210 : \$837 \}$
 $15m. : 4m. \} :: 24w. 3d. : 25w. 6d. +$
 For $24w. 3d. = 171d.$ And $837 \times 4 \times 171 = 572508$
 the dividend.
 And $210 \times 15 = 3150$ the divisor.
 Then $572508 \div 3150 = 181d. = 25w. 6d. + 2358$ Ans.
- (20) Thus $2\frac{1}{2}yrs. : 5yrs. \}$
 $\$15 : \$30 \} :: \$50 : \200
 For $5 \times 30 \times 50 = 7500$ the dividend.
 And $2\frac{1}{2} \times 15 = 37\frac{1}{2}$ the divisor.
 Then $7500 \div 37\frac{1}{2} = \200 . Ans.
- (21) Thus $5m. : 34m. \}$
 $4d. : 90d. \} :: \$20 50 cts. : \$3136 50 cts.$
 For $34 \times 90 \times 2050 = 6273000$ the dividend.
 And $5 \times 4 = 20$ the divisor.
 Then $6273000 \div 20 = \$3136 50 cts.$ Ans.
- (22) Thus $24cwt. : 76cwt. \}$
 $45m. : 121m. \} :: \$18 : \$153 26 cts. + 720$
 For $76 \times 121 \times 18 = 165528$ the dividend.
 And $24 \times 45 = 1080$ the divisor.
 Then $165528 \div 1080 = \$153 26 cts.$ Ans. +

- (23) Thus $42A. : 392A. \} :: 6men : 28men.$
 $14D. : 7D. \}$

For $392 \times 7 \times 6 = 16464$ the dividend.

And $42 \times 14 = 588$ the divisor.

Therefore $16464 \div 588 = 28men.$ Ans.

- (24) Thus $35cwt. : 50cwt. \} :: \$9\ 50cts. : \$101\ 78\frac{1}{2}cts.-$
 $20m. : 150m. \}$

For $50 \times 150 \times 950 = 7125000$ the dividend.

And $35 \times 20 = 700$ the divisor.

Then $7125000 \div 700 = \$101\ 78\frac{1}{2}cts. +$ Ans.

- (25) Thus $\$11\ 75cts. : \$31\ 18\frac{3}{4}cts. \} :: \$125 : \$663\ 5$
 $9m. : 1yr. 6mo. \} cts.$

For $3118\frac{3}{4} = 12475qrs. \times 18m. \times 125 = 28068750$ the dividend.

And $\$11\ 75cts. = 4700qrs. \times 9 = 42300$ the divisor.

Then $28068750 \div 42300 = \$663\ 56\frac{1}{4}cts. +$ Ans.

- (26) Thus $\$100 : \$275 \} :: \$8 : \77
 $12m. : 56m. \}$

For $275 \times 56 \times 6 = 92400$ the dividend.

And $100 \times 12 = 1200$ the divisor.

Then $92400 \div 1200 = \$77.$ Ans.

- (27) Thus $\$56 : \$8 \} :: \$560 : \100
 $12m. : 20m. \}$

For $6 \times 20 \times 560 = 67200$ the dividend.

And $56 \times 12 = 672$ the divisor.

Then $67200 \div 672 = \$100.$ Ans.

- (28) Thus $12yds. : 75yds. \} :: 5lb. : 18lbs. 12oz.$
 $5qrs. : 3qrs. \}$

For $75 \times 3 \times 5 = 1125$ the dividend.

And $12 \times 5 = 60$ the divisor.

Then $1125 \div 60 = 18lb. 12oz.$ Ans.

PRACTICE.

EXAMPLES.

CASE 1.

$$\begin{array}{r} (3) \quad \begin{array}{l} 1\frac{1}{2} \overline{) 296 \text{ at } \frac{3}{4}} \\ 1\frac{1}{2} \overline{) 148} \\ \hline 74 \end{array} \end{array}$$

Ans. \$2 22 cts.

$$(4) \quad \begin{array}{l} 1\frac{1}{2} \overline{) 3268 \text{ at } \frac{1}{2}} \end{array}$$

Ans. \$16 34 cts.

$$\begin{array}{r} (5) \quad \begin{array}{l} 1\frac{1}{2} \overline{) 4260 \text{ at } \frac{3}{4}} \\ 1\frac{1}{2} \overline{) 2130} \\ \hline 1065 \end{array} \end{array}$$

Ans. \$31 95 cts.

$$(6) \quad \begin{array}{l} 1\frac{1}{2} \overline{) 5324 \text{ at } \frac{1}{2}} \end{array}$$

Ans. \$13 31 cts.

$$(7) \quad \begin{array}{l} m. \\ 2\frac{1}{2} \overline{) 634 \text{ at } 2 \text{ mills.}} \end{array}$$

Ans. \$1 26 8

$$(8) \quad \begin{array}{l} m. \\ 2\frac{1}{2} \overline{) 352 \text{ at } 4 \text{ mills.}} \end{array}$$

70 4
70 4

Ans. \$1 40 8

$$(9) \quad \begin{array}{l} m. \\ 5\frac{1}{2} \overline{) 3456 \text{ at } 5 \text{ mills.}} \end{array}$$

Ans. \$17 28

$$(10) \quad \begin{array}{l} m. \\ 5\frac{1}{2} \overline{) 498 \text{ at } 6 \text{ mills.}} \end{array}$$

1 1/2 249
49 8

Ans. \$2 98 8

(11) $\begin{array}{r} m. \\ 5\frac{1}{2} \overline{) 8462 \text{ at } 8 \text{ mills.}} \\ 2\frac{1}{8} \overline{) 4231} \\ 1\frac{1}{8} \overline{) 1692 \text{ 4}} \\ \hline 846 \text{ 2} \end{array}$

Ans. \$67 69 6

(12) $\begin{array}{r} m. \\ 5\frac{1}{2} \overline{) 1264 \text{ at } 7 \text{ mills.}} \\ 2\frac{1}{8} \overline{) 632} \\ \hline 252 \text{ 8} \end{array}$

Ans. \$8 84 8

(13) $\begin{array}{r} m. \\ 5\frac{1}{2} \overline{) 4628 \text{ at } 9 \text{ mills.}} \\ 2\frac{1}{8} \overline{) 2314} \\ 2\frac{1}{8} \overline{) 925 \text{ 6}} \\ \hline 925 \text{ 6} \end{array}$

Ans. \$41 65 2

CASE 2.

(2) $\begin{array}{r} cts. \\ 6\frac{1}{4} \overline{) 3648 \text{ at } 6\frac{1}{4} \text{ cts.}} \\ \hline 228 \end{array}$

Ans. \$228

(3) $\begin{array}{r} cts. \\ 10\frac{1}{16} \overline{) 742 \text{ at } 10 \text{ cts.}} \\ \hline 74 \text{ 20} \end{array}$

Ans. \$74 20

(4) $\begin{array}{r} cts. \\ 20\frac{1}{3} \overline{) 8264 \text{ at } 20 \text{ cts.}} \\ \hline 1652 \text{ 80} \end{array}$

Ans. \$1652 80

(5) $\begin{array}{r} cts. \\ 25\frac{1}{4} \overline{) 386 \text{ at } 25 \text{ cts.}} \\ \hline 96 \text{ 50} \end{array}$

Ans. \$96 50

(6) $\begin{array}{r} cts. \\ 50\frac{1}{2} \overline{) 5876 \text{ at } 50 \text{ cts.}} \\ \hline 2938 \end{array}$

Ans. \$2938

(7) $\begin{array}{r} cts. \\ 25\frac{1}{4} \overline{) 3542 \text{ at } 45 \text{ cts.}} \\ 20\frac{1}{2} \overline{) 885 \text{ 50}} \\ \hline 708 \text{ 40} \end{array}$

Ans. \$1593 90

(8) $\begin{array}{r|l} \text{cts.} & \\ 50\frac{1}{2} & 31925 \text{ at } 80 \text{ cts.} \\ \hline 25\frac{1}{2} & 15962 \ 50 \\ 5\frac{1}{2} & 7981 \ 25 \\ \hline & 1596 \ 25 \\ \hline \text{Ans.} & \$25540 \ 00 \end{array}$

(9) $\begin{array}{r|l} \text{cts.} & \\ 12\frac{1}{2} & 4264 \text{ at } 12\frac{1}{2} \text{ cts.} \\ \hline \text{Ans.} & \$533 \end{array}$

(10) $\begin{array}{r|l} \text{cts.} & \\ 50\frac{1}{2} & 18626 \text{ at } 55 \text{ cts.} \\ \hline 5\frac{1}{10} & 9313 \\ & 931 \ 30 \\ \hline \text{Ans.} & \$10244 \ 30 \end{array}$

(11) $\begin{array}{r|l} \text{cts.} & \\ 25\frac{1}{4} & 1724 \text{ at } 37\frac{1}{2} \text{ cts.} \\ \hline 12\frac{1}{2} & 431 \\ & 215 \ 50 \\ \hline \text{Ans.} & \$846 \ 50 \end{array}$

(12) $\begin{array}{r|l} \text{cts.} & \\ 10\frac{1}{10} & 528 \text{ at } 16 \text{ cts.} \\ \hline 5\frac{1}{2} & 52 \ 80 \\ 1\frac{1}{2} & 26 \ 40 \\ & 5 \ 28 \\ \hline \text{Ans.} & \$84 \ 48 \end{array}$

(13) $\begin{array}{r|l} \text{cts.} & \\ 50\frac{1}{2} & 13854 \text{ at } 56\frac{1}{2} \text{ cts.} \\ \hline 6\frac{1}{4} & 6927 \\ & 865 \ 87 \ 5 \\ \hline \text{Ans.} & \$7792 \ 87 \ 5 \end{array}$

(14) $\begin{array}{r|l} \text{cts.} & \\ 20\frac{1}{2} & 4858 \text{ at } 29 \text{ cts.} \\ \hline 5\frac{1}{2} & 971 \ 60 \\ 4\frac{1}{2} & 242 \ 90 \\ & 194 \ 32 \\ \hline \text{Ans.} & \$1408 \ 82 \end{array}$

(15) $\begin{array}{r|l} \text{cts.} & \\ 50\frac{1}{2} & 2267 \text{ at } 85 \text{ cts.} \\ \hline 25\frac{1}{2} & 1133 \ 50 \\ 10\frac{1}{2} & 566 \ 75 \\ & 226 \ 70 \\ \hline \text{Ans.} & \$1926 \ 95 \end{array}$

$$\begin{array}{r} \text{cts.} \\ (16) \quad 20 \frac{1}{2} \overline{) 190} \text{ at } 20 \text{ cts.} \\ \text{Ans. } \$38 \end{array}$$

$$\begin{array}{r} \text{cts.} \\ (17) \quad 12 \frac{1}{2} \overline{) 3854} \text{ at } 18 \frac{1}{2} \text{ cts.} \\ \quad 6 \frac{1}{2} \overline{) 456} \quad 75 \\ \quad \quad 228 \quad 37 \quad 5 \\ \text{Ans. } \$885 \quad 12 \quad 5 \end{array}$$

$$\begin{array}{r} \text{cts.} \\ (18) \quad 50 \frac{1}{2} \overline{) 17638} \text{ at } 70 \text{ cts.} \\ \quad 10 \frac{1}{2} \overline{) 8819} \\ \quad 10 \frac{1}{2} \overline{) 1763} \quad 80 \\ \quad \quad 1763 \quad 80 \\ \text{Ans. } \$12346 \quad 60 \end{array}$$

CASE 3.

$$\begin{array}{r} \$ \text{ cts.} \\ (2) \quad 2 \frac{1}{2} \overline{) 10 \quad 25} \\ \quad \quad 10 \\ \quad \quad \quad 102 \quad 50 \\ \quad \quad \quad 7 \frac{1}{2} \overline{) 5 \quad 12 \quad 5} \\ \quad \quad \quad \quad 0 \quad 64 \quad 0 \\ \text{Ans. } \$108 \quad 26 \quad 5 \end{array}$$

$$\begin{array}{r} \$ \text{ cts.} \\ (3) \quad 2 \frac{1}{2} \overline{) 4 \quad 15} \\ \quad \quad 7 \\ \quad \quad \quad 29 \quad 05 \\ \quad \quad \quad 1 \frac{1}{2} \overline{) 2 \quad 07 \quad 5} \\ \quad \quad \quad 14 \frac{1}{2} \overline{) 1 \quad 03 \quad 7} \\ \quad \quad \quad 4 \frac{1}{2} \overline{) 0 \quad 51 \quad 8} \\ \quad \quad \quad 1 \frac{1}{2} \overline{) 0 \quad 14 \quad 8} \\ \quad \quad \quad \quad 0 \quad 3 \quad 7 \\ \text{Ans. } \$32 \quad 86 \quad 5 \end{array}$$

PRACTICE.

77

Cwt. qr. lb. \$ cts.
 (4) 129 1 10 at 1 05
 129

945
 210
 105

1	1	13545	
7	$\frac{1}{4}$	26 2	
2	$\frac{1}{4}$	6 5	
1	$\frac{1}{2}$	1 8	
		0 9	

Ans. \$135 80 4

Cwt. qr. \$
 (6) 130 1 at 15
 130

1	1	450	
	$\frac{1}{4}$	15	
		1950	
		3 75	

Ans. \$1953 75

qrs. lb. cts.
 (8) 2 14 at 2710

2	1	1355	
	$\frac{1}{2}$	338 $\frac{1}{2}$	

Ans. \$16 93 $\frac{1}{2}$

Cwt. qr. \$ cts.
 (5) 16 2 at 5 18
 16

2	1	3108	
	$\frac{1}{2}$	518	
		82 88	
		2 59	

Ans. \$85 47

Cwt. qr. lb. cts.
 (7) 25 1 9 at 175
 25

1	1	875	
4	$\frac{1}{4}$	350	
4	$\frac{1}{4}$	43 75	
1	$\frac{1}{4}$	43 7	
		6 2+	
		6 2+	
		1 5+	

Ans. \$44 32 6

lb. oz. dwt. gr. \$ cts.
 (9) 6 5 10 5 at 4 16
 6

4	1	2496	
1		138 6	
10		34 6	
5		17 3	
		3	

Ans. \$26 86 8

lb. oz. dwt. gr. cts.
 (10) 27 10 4 18 at 2635 (11) 9 11 17 22 at 611

6	1	18445
	$\frac{1}{2}$	5270
3	$1\frac{1}{2}$	711 45
1	$\frac{1}{2}$	13 17 5
4	$\frac{1}{2}$	6 58 7
12	$\frac{1}{2}$	2 19 5
6	$\frac{1}{2}$	43 9
		5 4
		2 7

Ans. \$733 92 7

6	1	551
4	$\frac{1}{2}$	30
1	$\frac{1}{4}$	20
10	$\frac{1}{2}$	5
5	$\frac{1}{2}$	2
2	$\frac{1}{2}$	1
12	$\frac{1}{2}$	
6	$\frac{1}{2}$	
2	$\frac{1}{2}$	
2	$\frac{1}{2}$	

Ans. \$61 2

oz. dwt. gr. cts.
 (12) 816 13 12 at 12 $\frac{1}{2}$ (13) 27 3 at 9 65

10	1	1632
	$\frac{1}{2}$	816
		408
		102 00
2	$1\frac{1}{2}$	6 2
1	$\frac{1}{2}$	1 2
12	$\frac{1}{2}$	6
		3

Ans. \$102 08 3

2	1	6755
	$\frac{1}{2}$	1930
		260 55
1	$1\frac{1}{2}$	4 82
		2 41

Ans. \$267 78

PRACTICE.

79

(14) $\begin{array}{r} \text{yd. gr. cts.} \\ 860 \text{ 1 at } 84 \\ \hline 860 \end{array}$

1	1	5040
	4	672
<hr/>		
		722 40
<hr/>		
		21

Ans. \$722 61

(15) $\begin{array}{r} \text{yd. gr. na. cts.} \\ 126 \text{ 2 2 at } 475 \\ \hline 126 \end{array}$

2	1	2850
		950
<hr/>		
		475
<hr/>		
		598 50
2	1	2 37 5
		59 3

Ans. \$601 46 8

(16) $\begin{array}{r} \text{gal. qt. cts.} \\ 428 \text{ 3 at } 140 \\ \hline 428 \end{array}$

2	1	1120
	2	280
<hr/>		
		560
<hr/>		
		599 20
1	1	70
	2	35

Ans. \$600 25

(17) $\begin{array}{r} \text{gal. qt. pt. cts.} \\ 765 \text{ 3 1 at } 218\frac{3}{4} \\ \hline 4 \end{array}$

2	1	875
		765
<hr/>		
		4375
<hr/>		
		5250
<hr/>		
		6125
<hr/>		
		6693 75
1	1	4 37
	2	18
1	1	1 09

4)6701 39

Ans. \$1675 34 $\frac{3}{4}$

	<i>hhd.</i>	<i>gal.</i>	<i>qt.</i>		\$	cts.
(19)	17	15	3	at	64	75
						17

$31\frac{1}{2}$	$\frac{1}{2}$	<u>235 60</u>
		23 56

Ans. \$259 16

	<i>bu.</i>	<i>pe.</i>	<i>cts.</i>
(20)	120	2 at	35
			120

$$\begin{array}{r|l} 2\frac{1}{3} & 700 \\ & 35 \\ \hline & 4200 \\ & 175 \end{array}$$

Ans. \$42 17 5

	bu.	pe.	qt.	pt.	cts.
(22)	1354	1	5	1	at 25
					1354

1	$\frac{1}{4}$	100	
		125	
		75	
		25	
		<hr/>	
		338	50
4	$\frac{1}{2}$	6	21
1	$\frac{1}{4}$	3	11
1	$\frac{1}{4}$		73
1	$\frac{1}{2}$		33

Ans. \$338 60 5¼

$$\begin{array}{r|l} 9\frac{1}{7} & \begin{array}{r} 453\ 25 \\ 647\ 5 \end{array} \end{array}$$

3	1100	75	
3	9	25	
3	3	08	3
3	3	08	3
		77	1

Ans. $\$1116 \overline{93 \ 7}$

	bu.	pe.	qt.		\$	cts.
(21)	780	3	2	at	1	17
	.					780

2	$\frac{1}{2}$	9360	
		819	
		912	60
1	$\frac{1}{2}$	58	5
2	$\frac{1}{4}$	29	2
		7	3

Ans. \$913 55 0

	<i>A.</i>	<i>R.</i>	<i>P.</i>		<i>\$</i>	<i>cts.</i>
(23)	35	2	18	at	54	35
						35

2	$\frac{1}{2}$	27175	
		16305	
		1902	25
16	$\frac{1}{3}$	27	17 5
2	$\frac{1}{8}$	5	43 5
			67 8

Ans. \$1935 53 8

FRACTION.

81

A. R. P. \$ cts.
(24) 146 3 10 at 35 10
146

A. R. P. \$ cts.
(25) 750 1 4 at 12 25
750

2 $\frac{1}{2}$	21060
	14040
	3510
	5124 60
1 $\frac{1}{2}$	17 55
10 $\frac{1}{2}$	8 77 5
	2 19 3+

Ans. \$5153 11 8+

1 $\frac{1}{4}$	61250
	8575
	9187 50
4 $\frac{1}{4}$	3 06 2 $\frac{1}{2}$
	0 30 6 $\frac{1}{2}$

Ans. \$9190 86 8 $\frac{1}{2}$

APPLICATION.

Cwt. qr. lb. \$ cts.
(1) 84 2 14 at 10 50
84

Cwt. qr. lb. cts.
(2) 17 1 7 at 1212 $\frac{1}{2}$
2

2 $\frac{1}{2}$	4200
	8400
	882 00
14 $\frac{1}{4}$	5 25
	1 31 2+

Ans. \$888 56 2+

1 $\frac{1}{4}$	2425 halves.
	17
	16975
	2425
	412 25
7 $\frac{1}{4}$	6 06 1 $\frac{1}{2}$
	1 51 5 $\frac{1}{2}$

2)419 89 7 mills.

Ans. \$209 91 3 mills.

T. wt. gr. \$ cts.
 (3) 15 10 3 at 80 15
 15

10	$\frac{1}{2}$	40075
		8015
		<hr/>
		1202 25
2	$\frac{1}{2}$	40 07 5
1	$\frac{1}{2}$	2 00 $3\frac{3}{4}$
		1 00 $1\frac{1}{2}$
		<hr/>

Ans. \$1245 33 $0\frac{1}{4}$

yd. gr. pie. yd.
 (4) 35 2 \times 170 = 6035 at $\frac{1}{4}$
 6035

4) 6035 *grs.*

Ans. \$15 08 $\frac{3}{4}$

A. R. P. \$ cts.
 (5) 175 3 12 at 52 15
 175

2	$\frac{1}{2}$	26075
		36505
		5215
		<hr/>
		9126 25
1	$\frac{1}{2}$	26 07 5
10	$\frac{1}{2}$	13 03 7
2	$\frac{1}{2}$	3 25 9
		0 65 1
		<hr/>

Ans. \$9169 27 2

(6) 1365 at $\frac{1}{2}$ ct. = \$6 82 $\frac{1}{2}$ cts. Ans. (7) 50 $\frac{1}{2}$ 784 at 84 cts

50	$\frac{1}{2}$	392
20	$\frac{1}{2}$	156 80
10	$\frac{1}{2}$	78 40
4	$\frac{1}{2}$	31 36
		<hr/>
		\$658 56
		<hr/>

STERLING MONEY.

CASE 1.

$$(4) \quad \begin{array}{r} \frac{1}{4} | \frac{1}{4} | 475 \text{ at } \frac{1}{4} \\ \hline 12 \overline{) 118 \frac{3}{4}} \end{array}$$

Ans. 9s. 10 $\frac{3}{4}$ d.

$$(5) \quad \begin{array}{r} \frac{1}{2} | \frac{1}{2} | 299 \text{ at } \frac{1}{2} \\ \hline 12 \overline{) 149 \frac{1}{2}} \end{array}$$

Ans. 12s. 5 $\frac{1}{2}$ d.

$$(6) \quad \begin{array}{r} \frac{1}{2} | \frac{1}{2} | 978 \text{ at } \frac{2}{4} \\ \hline \frac{1}{4} | \frac{1}{4} | 480 \\ \hline 12 \overline{) 244 \frac{1}{2}} \end{array}$$

$$12 \overline{) 733 \frac{1}{2}}$$

$$2 \overline{) 06} | 1 \quad 1$$

Ans. £3 1s. 1 $\frac{1}{2}$ d.

CASE 2.

$$(2) \quad \begin{array}{r} 2 | \frac{1}{8} | 978 \text{ at } 2d. \\ \hline 2 \overline{) 016} | 3 \end{array}$$

Ans. £8 3s.

$$(3) \quad \begin{array}{r} 4 | \frac{1}{3} | 499 \text{ at } 5d. \\ \hline 1 | \frac{1}{4} | 166 \quad 4 \\ \hline 41 \quad 7 \end{array}$$

$$2 \overline{) 020} | 7 \quad 11$$

Ans. £10 7s. 11d.

$$(4) \quad \begin{array}{r} 6 | \frac{1}{2} | 792 \text{ at } 6d. \\ \hline 2 \overline{) 039} | 6 \end{array}$$

Ans. £19 16s.

$$(5) \quad \begin{array}{r} 6 | \frac{1}{2} | 888 \text{ at } 9d. \\ \hline 3 | \frac{1}{2} | 444 \\ \hline 222 \end{array}$$

$$2 \overline{) 066} | 6$$

Ans. £33 6s.

PRACTICE.

$$(6) \begin{array}{r} 6\frac{1}{2} \overline{) 921 \text{ at } 11d.} \\ 3\frac{1}{2} \overline{) 460 \text{ 6}} \\ 2\frac{1}{2} \overline{) 230 \text{ 3}} \\ \underline{153 \text{ 6}} \end{array}$$

$$2|0)84|4 \text{ 3}$$

Ans. £42 4s. 3d.

CASE 3.

$$(2) \begin{array}{r} 3\frac{1}{4} \overline{) 487 \text{ at } 15d.} \\ \underline{121 \text{ 9}} \end{array}$$

$$2|0)60|8-9$$

Ans. £30 8s. 9d.

$$(3) \begin{array}{r} 6\frac{1}{2} \overline{) 979 \text{ at } 22\frac{1}{2}} \\ 3\frac{1}{2} \overline{) 489 \text{ 6}} \\ 1\frac{1}{2} \overline{) 244 \text{ 9}} \\ \underline{81 \text{ 7}} \\ 20 \text{ 4}\frac{1}{2} \end{array}$$

$$2|0)181|5 \text{ 2}\frac{1}{2}$$

Ans. £90 15s. 2½d.

$$(4) \begin{array}{r} 6\frac{1}{2} \overline{) 532 \text{ at } 23\frac{1}{2}d.} \\ 4\frac{1}{2} \overline{) 266} \\ 1\frac{1}{2} \overline{) 177 \text{ 4}} \\ \underline{44 \text{ 4}} \\ 22 \text{ 2} \\ \underline{11 \text{ 1}} \end{array}$$

$$2|0)105|2 \text{ 11}$$

Ans. £52 12s. 11d.

CASE 4.

$$(2) \begin{array}{r} 5\frac{1}{2} \overline{) 489 \text{ at } 5s.} \end{array}$$

Ans. £122 5s.

(3) $10\frac{1}{2} \mid 937 \text{ at } 11s.$

$$\begin{array}{r|l} 1\frac{1}{10} & 468 \ 10 \\ & 46 \ 17 \\ \hline \end{array}$$

Ans. £515 7s.

(4) $10\frac{1}{2} \mid 1286 \text{ at } 15s.$

$$\begin{array}{r|l} 5\frac{1}{5} & 643 \\ & 321 \ 10 \\ \hline \end{array}$$

Ans. £964 10s.

(5) $10\frac{1}{2} \mid 2798 \text{ at } 19s.$

$$\begin{array}{r|l} 5\frac{1}{5} & 1399 \\ 4\frac{1}{5} & 699 \ 10 \\ \hline & 559 \ 12 \\ \hline \end{array}$$

Ans. £2658 2s.

CASE 5.

(2) $10\frac{1}{2} \mid 569 \text{ at } 4 \ 13 \ 7\frac{1}{4} \text{ } £ \ s. \ d.$

$$\begin{array}{r|l} & 4 \\ \hline & 2276 \\ 2\frac{1}{2} & 284 \ 10 \\ 1\frac{1}{2} & 56 \ 18 \\ 6\frac{1}{2} & 28 \ 9 \\ 1\frac{1}{2} & 14 \ 4 \ 6 \\ \frac{1}{2} & 2 \ 7 \ 5 \\ & 1 \ 3 \ 8\frac{1}{2} \\ \hline \end{array}$$

Ans. £2663 12 7 $\frac{1}{2}$

(3) $10\frac{1}{2} \mid 1967 \text{ at } 5 \ 16 \ 9\frac{3}{4} \text{ } £ \ s. \ d.$

$$\begin{array}{r|l} & 5 \\ \hline & 9835 \\ 5\frac{1}{2} & 983 \ 10 \\ 1\frac{1}{2} & 491 \ 15 \\ 6\frac{1}{2} & 98 \ 7 \\ 3\frac{1}{2} & 49 \ 3 \ 6 \\ \frac{3}{4} & 24 \ 11 \ 9 \\ & 6 \ 2 \ 11\frac{1}{4} \\ \hline \end{array}$$

Ans. £11488 10 2 $\frac{1}{4}$

	7	
	<u>20825</u>	
5	1487	10
4	743	15
8	595	
2	99	3 4
1	24	15 10
$\frac{1}{4}$	12	7 11
$\frac{1}{2}$	6	3 11 $\frac{1}{2}$
	3	1 11 $\frac{1}{2}$

Ans. £23796 18 0 $\frac{1}{4}$

	<i>C.</i>	<i>qr.</i>	<i>lb.</i>	£	<i>s.</i>	<i>d.</i>		<i>C.</i>	<i>qr.</i>	<i>lb.</i>	£	<i>s.</i>	<i>d.</i>
(2)	9	2	17	at 4	7	6	(3)	11	1	16	at 5	6	7
						9							11

2	$\frac{1}{2}$	39	7	6
14	$\frac{1}{4}$	2	3	9
2	$\frac{1}{2}$	0	10	11
1	$\frac{1}{2}$		1	6
				2

Ans. £42 4 6½

1	$\frac{1}{4}$	58	12	10
14	$\frac{1}{5}$	1	6	7
2	$\frac{1}{7}$		13	3
			1	10

Ans. £60 14 8

(4) $\begin{array}{r} C. \text{ gr. lb.} \\ 7 \ 3 \ 22 \end{array}$ at $\begin{array}{r} £ \ s. \ d. \\ 1 \ 18 \ 4\frac{3}{4} \end{array}$ (5) $\begin{array}{r} C. \text{ gr. lb.} \\ 27 \ 1 \ 19 \end{array}$ at $\begin{array}{r} £ \ s. \ d. \\ 2 \ 17 \ 8\frac{1}{4} \end{array}$

2	1	13	8	9
1	1	0	19	2
14	1		9	7
7	1		4	9
1	1		2	4
				4

Ans. £15 5 0 $\frac{3}{4}$

1	$\frac{1}{4}$	8	13	$0\frac{3}{4}$
			9	
14	$\frac{1}{2}$	77	17	$6\frac{3}{4}$
4	$\frac{1}{7}$		14	5+
1	$\frac{1}{4}$		7	$2\frac{1}{2}$
			2	$0\frac{1}{2}$
				6+

Ans. £79 1 8 $\frac{3}{4}$

TARE AND TRET.

CASE 1.

<i>Cwt. qr. lb.</i>	<i>Cwt. qr. lb.</i>	<i>Cwt. qr. lb.</i>
(2) 7 3 20	(3) 6 2 5	(4) 369 2 21
8	— 1 11	—10 1 12
gross 63 1 20	Ans. 6 0 22	Ans. 359 1 9
—5 1 19		
Ans. 58 0 1		

<i>Cwt. qr. lb.</i>	<i>C. qr. lb.</i>	<i>lb.</i>
(5) 5 1 19	(6) No. 1. 3 2 19 tare 34	
8	No. 2. 6 0 13 tare 57	
	No. 3. 4 3 5 tare 46	
43 1 12 whole gross.		<i>C. qr. lb.</i>
—2 0 23 tare.	14 2 9 w.t. 137=	1 0 25
Ans. 41 0 17 neat.	—1 0 25	
	Ans. 13 1 12	

CASE 2.

<i>C. qr. lb.</i>	<i>qr. lbs.</i>
(2) 4 2 24	2 18
7	7
33 0 0 gross.	4cwt. 2qrs. 14lbs. whole tare.
4 2 14 tare.	
Ans. 28 1 14 neat.	

TARE AND TRET.

(3) $\begin{array}{r} C. \text{ gr. } lb. \\ 21 \ 2 \ 21 \\ 3 \ 0 \ 18 \end{array}$

Neat 18 2 3 at $\frac{5}{18}$ $\frac{\$}{cts.}$

<i>grs.</i>	2	$\frac{1}{2}$	4400
			550
<i>lbs.</i>	2	$\frac{1}{2}$	9900
	1	$\frac{1}{2}$	275
			9 8+
			4 9

Ans. $\$101 \ 89 \ 7$

(4) $\begin{array}{r} C. \text{ gr. } lb. \\ 2 \ 1 \ 25 \\ 9 \end{array}$ $\begin{array}{r} lb. \\ 30 \\ 9 \end{array}$

$\begin{array}{r} 22 \ 1 \ 1 \text{ gross.} \\ 2 \ 1 \ 18 \text{ tare.} \end{array}$

$\begin{array}{r} C. \text{ gr. } lb. \\ 270 = 2 \ 1 \ 18 \end{array}$

Neat 19 3 11 at $\frac{5}{19}$ $\frac{\$}{cts.}$

<i>grs.</i>	2	$\frac{1}{2}$	45 90
			51 0
			96 90
	1	$\frac{1}{2}$	2 55
	7	$\frac{1}{2}$	1 27 5
	4	$\frac{1}{2}$	31 8+
			18 2+

Ans. $\$101 \ 22 \ 5 \text{ value.}$

CASE 3.

(2) $\begin{array}{r} C. \text{ gr. } lb. \\ 7 \quad 3 \quad 14 \\ 4 \end{array}$

<i>lbs.</i>				
16	$\frac{1}{7}$	31	2	0 gross.
4	$\frac{1}{4}$	4	2	0
		1	0	14
		5	2	14 tare.

Ans. 25 3 14 neat.

(3) $\begin{array}{r} C. \text{ gr. } lb. \\ 5 \quad 1 \quad 13 \\ 10 \end{array}$

<i>lbs.</i>				
16	$\frac{1}{4}$	53	2	18 gross.
		7	2	18+ tare.

Neat 46 0 0 at $\begin{array}{r} \$ \text{ cts.} \\ 8 \quad 75 \\ 46 \end{array}$

5250
3500

Ans. \$402 50 value.

TARE AND TRET.

(4) 4C. 1qr. 24lb.

6

^{lbs.} 16 $\frac{1}{4}$	26	3	4 gross.
2 $\frac{1}{8}$	3	3	8 $\frac{1}{2}$
	0	1	25 $\frac{1}{2}$

Tare 4 1 5

Neat ^{lbs.} 22 1 27 = ^{cts.} 2519 at $7\frac{1}{2}$

7 $\frac{1}{2}$
17633
1259 5

Ans. \$188 92 $\frac{5}{8}$ value.

CASE 4.

(2) 2C. 1qr. 10lb.

12

^{lbs.} 16 $\frac{1}{4}$	28	0	8 gross.
2 $\frac{1}{8}$	4	0	1
	0	2	0
	4	2	1 tare.
^{lbs.} 4 $\frac{1}{8}$	23	2	7uttle.
	0	3	17 tret.

Neat ^{cts.} 22 2 18 at 19 60
22

2 $\frac{1}{4}$	39	20
	392	0
^{lbs.} 14 $\frac{1}{4}$	431	20
	9	80
	2	45
2 $\frac{1}{4}$	35	
2 $\frac{1}{4}$	35	

Ans. \$444 15 value.

TARE AND TRET.

91

C. gr. lb.			gr. lb.		
(3)	4	1 11	1	5	
		6		6	
<hr/>			<hr/>		
26	0	10 gross.	col. 1	3	2 tare.
1	3	2 tare.	<hr/>		

$\frac{1}{16}$)24	1	8	suttle.
—0	3	20	tret.
<hr/>			
Neat 23	1	16	at 6
<hr/>			
			\$ cts.
			75
			23

qrs.		
1	$\frac{1}{4}$	20 25
		135 0
<hr/>		
lbs.		155 25
14	$\frac{1}{4}$	1 68 $\frac{3}{4}$
2	$\frac{1}{4}$	84 $\frac{1}{2}$
		12

Ans. \$157 90 value.

APPLICATION.

C. gr. lb.		
(1)	17	3 22 gross.
		3 14 tare.
<hr/>		
Neat 17	0	8=1912 at 23 $\frac{1}{4}$
<hr/>		23 $\frac{1}{4}$

5736
3824
478

Ans. \$444 54

TARE AND TRET.

(2)	5C. 2qr. 19lb.	2qr. 25lb.
	$3 \times 5 = 15$	3
	<u>17 0 1</u>	<u>2 0 19</u>
	5	5
	85 0 5 gross.	C.10 3 11
	10 3 11 tare.	

Neat 74 0 22 at \$6 75cts.

16	$\frac{1}{7}$	27 00
		472 5
		<u>499 50</u>
4	$\frac{1}{4}$	96
2	$\frac{1}{2}$	24
		<u>12</u>

Ans. \$500 82 value.

(3)	C. qr. lb.
No. 1.	6 3 18
No. 2.	7 0 10
No. 3.	5 3 26
No. 4.	8 0 3

8	$\frac{1}{4}$	28 0 1 gross.
4	$\frac{1}{2}$	2 0 0
		1 0 0
		<u>3 0 0 tare.</u>

Neat 25 0 1 at \$3 75cts.

25		18 75
		75 0
1	$\frac{1}{4}$	93 75
		<u>3 3</u>

Ans. \$93 78 3 value.

TARE AND TRET.

93

(4) 1C. 1qr. 23lb. 18lb.
 $4 \times 6 = 24$ 24
 5 3 8 72
 6 36
 34 3 20 gross. 432 = 3 3 12 tare.
 3 3 12 tare.

Neat 31 0 8 at \$5 17 $\frac{1}{2}$ cts.
 2

8 $\frac{1}{4}$	1035 halves.
	31
	1035
	3105
	32085
	73 9

2)32158 9

Ans. \$160 79 4 value.

(5) 1C. 1qr. 13lb. 22lb.
 $3 \times 5 = 15$ 15
 4 0 11 110
 5 22
 20 1 27 gross. 330 = 2 3 22 tare.
 2 3 22 tare.

Neat 17 2 5 at \$9 64cts.
 17

2 $\frac{1}{4}$	67 48
	96 4
lb.	163 88
4 $\frac{1}{4}$	4 82
1 $\frac{1}{4}$	34 4
	8 6

Ans. \$169 13 0

INTEREST.

(6) $\begin{array}{r} C. \text{ gr. } lb. \\ 6 \quad 2 \quad 14 \\ 10 \end{array}$

$lb.$				
16	$\frac{1}{4}$	66	1	0 gross.
2	$\frac{1}{8}$	9	1	24
		1	0	20
		10	2	16 tare.
$lb.$				
4	$\frac{1}{28}$	55	2	12uttle.
		2	0	15 tret.

Neat $\begin{array}{r} lb. \quad cts. \\ 53 \quad 1 \quad 25 = 5989 \text{ at } 11\frac{1}{2} \end{array}$

$\begin{array}{r} 65879 \\ 2994 \quad 5 \end{array}$

Ans. \$688 73 5 value.



INTEREST.

EXAMPLES IN CASE 1.

(2) $\begin{array}{r} \$ \\ 225 \\ 7 \end{array}$

Ans. \$15 75

(3) $\begin{array}{r} \$ \quad cts. \\ 384 \quad 50 \\ 5 \end{array}$

Ans. \$19 22 5 m.

INTEREST.

95

$$\begin{array}{r} \text{£ } s. \\ (4) \quad 580 \quad 10 \\ \quad \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{£ } s. d. \\ \text{£} 34 \quad 83 \quad 0 \quad \text{Ans.} \quad 34 \quad 16 \quad 7 \\ \quad \quad 20 \\ \hline \end{array}$$

$$s. 16 \quad 60$$

$$12$$

$$d. 7 \quad 20$$

$$\begin{array}{r} \text{£ } cts. \\ (5) \quad 1654 \quad 81 \\ \quad \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{£ } cts. \\ \text{£} 82 \quad 74 \quad 05 \quad \text{Ans.} \quad 82 \quad 74 \\ \hline \end{array}$$

$$\begin{array}{r} \text{£} \\ (6) \quad \begin{array}{|l|} \hline 1 \\ \hline \end{array} \begin{array}{|l|} \hline 1 \\ \hline \end{array} \begin{array}{|l|} \hline 1 \\ \hline \end{array} 1500 \\ \hline \text{Ans. } \text{£} 7 \quad 50 \\ \hline \end{array}$$

$$\begin{array}{r} \text{£} \quad \text{£ } s. d. \\ (7) \quad 350 \quad \text{Ans.} \quad 18 \quad 7 \quad 6 \\ \quad \quad 5\frac{1}{4} \\ \hline \end{array}$$

$$1750$$

$$87 \quad 10$$

$$\text{£} 18 \quad 37 \quad 10$$

$$20$$

$$s. 7 \quad 50$$

$$12$$

$$d. 6 \quad 00$$

$$\begin{array}{r} \text{£} \\ (8) \quad \begin{array}{|l|} \hline 1 \\ \hline \end{array} \begin{array}{|l|} \hline 1 \\ \hline \end{array} \begin{array}{|l|} \hline 1 \\ \hline \end{array} 524 \\ \hline \quad \quad 5\frac{1}{4} \\ \hline 2620 \\ 131 \\ \hline \text{Ans. } \text{£} 27 \quad 51 \\ \hline \end{array}$$

$$\begin{array}{r} \text{£} \\ (9) \quad \begin{array}{|l|} \hline 1 \\ \hline \end{array} \begin{array}{|l|} \hline 1 \\ \hline \end{array} \begin{array}{|l|} \hline 1 \\ \hline \end{array} 842 \\ \hline \quad \quad 5\frac{1}{4} \\ \hline 4210 \\ 421 \\ \hline \text{Ans. } \text{£} 46 \quad 31 \\ \hline \end{array}$$

CASE 2.

$\begin{array}{r} \$ \\ (2) \ 540 \\ \underline{5} \\ 27 00 \\ \underline{20} \\ \text{Ans. } \$54 00 \end{array}$	$\begin{array}{r} £ \ s. \ d. \\ (3) \ 124 \ 5 \ 6 \\ \underline{4} \\ £4 97 \ 2 \ 0 \\ \underline{20} \\ £14 \ 18 \ 3 \ \text{Ans.} \end{array}$	$\begin{array}{r} £ \ s. \ d. \\ 4 \ 19 \ 5 \ \text{Int. for 1 year.} \\ \underline{3} \\ 20 \\ \underline{12} \\ d.5 04 \end{array}$
--	---	---

$$\begin{array}{r} \$ \\ (4) \ 482 \\ \underline{6} \\ \$28|92 \ \text{interest for 1 year.} \\ \underline{7} \\ \text{Ans. } \$202|44 \end{array}$$

CASE 3.

$\begin{array}{r} \$ \\ (2) \ 325 \\ \underline{4} \end{array}$	$\begin{array}{r} \text{mo.} \\ 2 \ \frac{1}{2} \end{array}$	$\begin{array}{r} 13 00 \ \text{Int. for 1 yr.} \\ \underline{4} \\ 52 \ \text{Int. for 4 yrs.} \\ 2 16 6 \ \text{Int. for 2 mo.} \end{array}$
$\text{Ans. } \$54 \ 16 \ 6$		

$$\begin{array}{r}
 \text{\$} \\
 (3) \quad 840 \\
 \quad \quad 4 \\
 \hline
 \begin{array}{|l|l|l|}
 \text{mo.} & & \\
 \hline
 3 & \frac{1}{2} & 33\frac{60}{5} \text{ Int. for 1 yr.} \\
 \hline
 \end{array} \\
 \hline
 168\frac{00}{5} \text{ Int. for 5 yrs.} \\
 8\frac{40}{5} \text{ Int. for 3 mo.}
 \end{array}$$

Ans. $\underline{\$176 \ 40}$

$$\begin{array}{r}
 \text{\$} \\
 (4) \quad 840 \\
 \quad \quad 7 \\
 \hline
 \begin{array}{|l|l|l|}
 \text{mo.} & & \\
 \hline
 4 & \frac{1}{3} & 58\frac{80}{5} \text{ Int. for 1 yr.} \\
 \hline
 \end{array} \\
 \hline
 294\frac{00}{5} \text{ Int. for 5 yrs.} \\
 19\frac{60}{5} \text{ Int. for 4 mo.}
 \end{array}$$

Ans. $\underline{\$313 \ 60}$

$$\begin{array}{r}
 \text{\$} \\
 (6) \quad 1200 \\
 \quad \quad 5
 \end{array}$$

Ans. $\$60 \ 00$ Int. for 1 yr. Then say, as 1 yr. : 15w. ::
 $\$60 : \$17 \ 30\text{cts.}$ Ans.

$$\begin{array}{r}
 \text{\$} \\
 (7) \quad \begin{array}{|l|l|l|}
 \hline
 \frac{1}{2} & \frac{1}{2} & 240 \\
 \hline
 & & 4\frac{3}{4} \\
 \hline
 & & 960 \\
 \hline
 \frac{1}{4} & \frac{1}{2} & 120 \\
 \hline
 & & 60 \\
 \hline
 \end{array}
 \end{array}$$

Ans. $\$11 \ 40$ Int. for 1 yr. Then say, as 1 yr. : 61d. ::
 $\$11 \ 40 : \$1 \ 90\text{cts.}$ Ans.

$$\begin{array}{r} \text{£} \\ (8) \quad 1000 \\ \quad \quad 7 \\ \hline \end{array}$$

$\text{£}70 \ 00$ Int for 1 yr. Then as 1 yr. : 14 mo. :: $\text{£}70$
 $\text{£}81 \ 13s. \ 4d.$ Ans.

$$\begin{array}{r} \$ \\ (9) \quad 450 \\ \quad \quad 5\frac{1}{2} \\ \hline 2250 \\ 225 \\ \hline \end{array}$$

$\$24 \ 75$ Int. for 1 yr. Then as 1 yr. : 6 mo. 20 d.
 $\$24 \ 75cts. : \$13 \ 75cts. +$ An

$$\begin{array}{r} \$ \text{ cts.} \\ (19) \quad 375 \ 25 \\ \quad \quad \quad 6 \\ \hline \end{array}$$

$\$22 \ 51 \ 50$ Int. for 1 yr. Then as 1 yr. : 3 yrs. 2 mo. 3
 5 d. :: $\$22 \ 51cts. \ 5m. : 73 \ 03 +$ An

CASE 4.

$$\begin{array}{r} \$ \\ (2) \quad 854 \\ \quad \quad 30 \\ \hline 6)25620 \\ \hline \text{Ans. } \$4 \ 27 \ 0 \\ \hline \end{array}$$

$$\begin{array}{r} \$ \\ (3) \quad 1100 \\ \quad \quad 48 \\ \hline 8800 \\ 4400 \\ \hline 6)52800 \\ \hline \text{Ans. } \$8 \ 80 \ 0 \\ \hline \end{array}$$

$$\begin{array}{r} \text{\$} \\ (4) \quad 3459 \\ \quad 75 \\ \hline \end{array}$$

$$\begin{array}{r} 17295 \\ 24213 \\ \hline \end{array}$$

$$6)259425$$

$$\text{Ans. } \$43 \ 23 \ 7$$

$$\begin{array}{r} \text{\$} \\ (5) \quad 1500 \\ \quad 80. \\ \hline \end{array}$$

$$6)90000$$

$$\begin{array}{r} 1\frac{1}{4} | 15000m. \text{ at } 6 \text{ per cent.} \\ \hline -2500 \\ \hline \end{array}$$

$$\text{Ans. } \$12 \ 50 \ 0$$

CASE 5.

$$\begin{array}{r} (2) \quad 6 \text{ yrs.} \\ \quad 4 \text{ dolls.} \\ \hline \end{array}$$

$$\begin{array}{r} 24 \text{ Int. of } £100 \text{ for } 6 \text{ yrs.} \\ +100 \\ \hline \end{array}$$

$$£124 \text{ amount of } £100 \text{ for } 6 \text{ yrs.}$$

$$\text{Then as } £124 : £1240 :: £100 : 1000. \text{ Ans.}$$

$$\begin{array}{r} (3) \quad 5 \text{ yrs.} \\ \quad 6 \text{ dolls.} \\ \hline \end{array}$$

$$\begin{array}{r} 30 \text{ Int. of } \$100 \text{ for } 5 \text{ yrs.} \\ 100 \\ \hline \end{array}$$

$$\$130 \text{ amount of } \$100 \text{ for } 5 \text{ yrs.}$$

$$\text{Then as } \$130 : \$2470 :: \$100 : \$1900. \text{ Ans.}$$

CASE 6.

$$\begin{array}{r} \text{\$} \\ (2) \quad 1476 \text{ amt.} \\ \quad 1200 \text{ prin.} \\ \hline \end{array}$$

$$\$276 \text{ Int.}$$

$$\text{And } \$1200 : \$100 :: \$276 : \$23 \text{ int. of } \$100 \text{ for the same time.}$$

$$\text{Then as } 5 \text{ yrs. } 9 \text{ mo.} : \$23 :: 1 \text{ yr.} : \$4 \text{ per cent. Ans.}$$

100

INTEREST.

	\$	cts.	
(3)	927	82½	amt.
	834	00	prin.
	<hr/>		
	\$93	82½	int.

As \$834 : \$93 82½ cts. :: \$100 : \$11 25 cts.

And then, as 2 yrs. 6 mo. : \$11 25 cts. :: 1 yr. : \$4½ per c.

Ans.

CASE 7.

	£	£
(2)	1600	2048
	4	1600
	<hr/>	

£64 00 : 1 yr. :: 448 : 7 yrs. Ans.

(3)	\$
	1000
	4½
	<hr/>
	40 00
	5 00
	<hr/>

\$45 00 : 1 yr. :: \$281 25 cts. : 6 yrs. 3 mo. Ans.

COMPOUND INTEREST.

	\$
(2)	760 prin.
	6 rate per cent.

45 60 int. 1st year.

805 60 amt. of 1st yr. and prin. for the 2d yr

48 33 6 int. of 2d yr.

853 93 6 amt. of 2d yr. and prin. for the 3d

51 23 6 int. of 3d yr.

905 17 2 amt. of 3d yr.

760 00 0 1st prin.Ans. \$145 17 2 compound int.

INTEREST.

101

(3) £ s. d.
242 10 6
6

£14|55 3 0
20

11|03

£ s. d.

242 10 6

14 11 0 int. 1st yr.

257 1 6 amt.

15 8 5½ int. 2d yr.

272 9 11½ amt.

16 7 0 int. 3d yr.

288 16 11½ amt.

17 6 7½ int. 4th yr.

306 3 7 amt.

—242 10 6 1st. prin.

Ans. 63 13 1+ com. int.

(4) \$
1300
5

65|00 int. 1st yr.

1300

1365 amt.

5

68|25 int. for 2d yr.

1365

1433|25 amt.

5

71|66½ int. for 3d yr.

1433|25

Ans. \$1504 91 2m. amt.

INTEREST.

$$\begin{array}{r}
 \text{\$} \\
 (5) \quad 3127 \\
 \quad \quad 4\frac{1}{2} \\
 \hline
 12508 \\
 1563 \ 5 \\
 \hline
 \text{\$}140 \ 71 \ 5
 \end{array}$$

$$\begin{array}{r}
 \text{\$} \\
 3127 \\
 140 \ 71 \ 5 \text{ int. of the 1st yr.} \\
 \hline
 3267 \ 71 \ 5 \text{ amt.} \\
 147 \ 4 \ 7 \text{ int. 2d yr.} \\
 \hline
 3414 \ 76 \ 2 \text{ amt.} \\
 153 \ 66 \ 4 \text{ int. 3d yr.} \\
 \hline
 3568 \ 42 \ 6 \text{ amt.} \\
 160 \ 57 \ 9 \text{ int. 4th yr.} \\
 \hline
 \text{Ans. } \text{\$}3729 \ 00 \ 5 \text{ amt.}
 \end{array}$$

PROMISCUOUS EXAMPLES,

$$\begin{array}{r}
 \text{\$} \text{ cts.} \\
 (1) \quad 620 \ 25 \\
 \quad \quad 5\frac{1}{2} \\
 \hline
 3101 \ 25 \\
 310 \ 12 \\
 \hline
 34 \ 11 \ 37 \text{ int. for 1 yr.} \\
 \quad \quad 5
 \end{array}$$

$$\begin{array}{r}
 \text{£} \\
 (2) \quad 420 \\
 \quad \quad 7 \\
 \hline
 \text{£}29 \ 40 \\
 \quad \quad 20 \\
 \hline
 \text{s.}8 \ 00
 \end{array}$$

$$\begin{array}{r}
 \text{Ans. } \text{\$}170 \ 56 \ 8\text{m.}
 \end{array}$$

$$\begin{array}{r}
 \text{\$} \\
 (3) \quad 1450 \\
 \quad \quad 60 \\
 \hline
 6)87000
 \end{array}$$

$$\begin{array}{r}
 14500 \text{ mills} = \text{\$}14 \ 50\text{cts.} \quad \text{Ans.}
 \end{array}$$

103

(4)	$ \begin{array}{r} \text{£} \quad s. \\ 626 \quad 5 \\ \hline 5\frac{1}{4} \\ \hline 1313 \quad 5 \\ 156 \quad 11 \quad 3 \\ \hline \text{£} 32 87 \quad 16 \quad 3 \\ \phantom{\text{£} 32 } .20 \\ \hline s. 17 56 \\ 12 \\ \hline d. 6 75 \\ 4 \\ \hline \text{qrs. } 3 00 \end{array} $	$ \begin{array}{r} \text{£} \quad s. \quad d. \\ 626 \quad 5 \quad 0 \\ \hline 32 \quad 17 \quad 6\frac{3}{4} \text{ int. of the 1st yr.} \\ \hline 659 \quad 2 \quad 6\frac{3}{4} \text{ amt.} \\ 34 \quad 12 \quad 1 \text{ int. of 2d yr.} \\ \hline 693 \quad 14 \quad 7\frac{3}{4} \text{ amt.} \\ 36 \quad 8 \quad 5 \text{ int. of 3d yr.} \\ \hline 730 \quad 3 \quad 0\frac{3}{4} \text{ amt.} \\ -626 \quad 5 \quad 0 \text{ prin.} \\ \hline \text{Ans. } \text{£} 103 \quad 18 \quad 0\frac{3}{4} + \text{ compound int.} \end{array} $
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(5) £ 1659 4

	£66 36
	20
	<hr/>
	s.7 20
	12
	<hr/>
Int. for 1 yr.	d.2 40
	4
	<hr/>
	qr.1 60

Then as 365 *days* : 21 *days* :: £66 7*s.* 2¼*d.* : £3 16*s.* 4¼*d.* +
Ans.

104 INSURANCE, COMMISSION AND BROKAGE.

$$\begin{array}{r} \$ \\ (6) \quad 500 \\ \quad 8 \\ \hline \end{array}$$

\$40 00 int. for 1 yr.

Then as \$40 : \$500 :: 1y. : 12yrs. 6mo. Ans.

(7) Thus, 6yrs. and 6mo. at 2 per cent. = \$13 interest on \$100.

Then \$13 + \$100 = \$113 = amount of \$100.

And as \$113 : \$250 :: \$100 : \$221 23cts. 9m. Ans.

$$\begin{array}{r} £ \\ (8) \quad 450 \text{ amount.} \\ \quad 300 \text{ principal.} \\ \hline \end{array}$$

£150 interest.

Then as £300 : £100 :: £150 : £50 which divided by the 5 years = 10 per cent. Ans.



INSURANCE, COMMISSION AND BROKAGE.

EXAMPLES.

$$\begin{array}{r} £ \\ (2) \quad 1320 \\ \quad 5 \\ \hline \text{Ans. } £66|00 \end{array}$$

$$\begin{array}{r} \$ \\ (3) \quad 3450 \\ \quad 4\frac{1}{2} \\ \hline 13800 \\ 1725 \\ \hline \end{array}$$

Ans. \$155|25cts.

$$\begin{array}{r} \$ \\ (4) \quad 1\frac{1}{2} | 1680 \\ \quad 2\frac{1}{2} \\ \hline 3360 \\ 840 \\ 420 \\ \hline \end{array}$$

\$46|20 commission.

\$1680 - \$46 20cts. = \$1633|80cts. Ans.

$$\begin{array}{r} \text{£} \\ (5) \quad 760 \\ \quad 6\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 4560 \\ 380 \\ \hline \end{array}$$

$$\text{£}49|40 \text{ Ans. } \text{£}49 \text{ 8s.}$$

$$\begin{array}{r} 20 \\ \hline \end{array}$$

$$\begin{array}{r} \text{s.}8|00 \\ \hline \end{array}$$

$$\begin{array}{r} \text{£} \\ (6) \quad \frac{1}{2} \left| \frac{1}{2} \right| 5630 \\ \quad \quad \quad 7\frac{3}{4} \\ \hline 39410 \\ \frac{1}{4} \left| \frac{1}{2} \right| 2815 \\ \quad \quad \quad 1407 \text{ 5} \\ \hline \end{array}$$

$$\text{Ans. } \text{£}436|32|5\text{m.}$$

$$\begin{array}{r} \text{£} \\ (7) \quad \frac{1}{2} \left| \frac{1}{2} \right| 17654 \\ \quad \quad \quad 18\frac{3}{4} \\ \hline 141232 \\ 17654 \\ \frac{1}{4} \left| \frac{1}{2} \right| 8827 \\ \quad \quad \quad 4413 \frac{1}{2} \\ \hline \end{array}$$

$$\text{Ans. } \text{£}3310|12 \frac{1}{2}$$

$$\begin{array}{r} \text{£} \\ (8) \quad 2150 \\ \quad 2 \\ \hline \end{array}$$

$$\text{Ans. } \text{£}43|00$$

$$\begin{array}{r} \text{£} \text{ cts.} \\ (9) \quad \frac{1}{4} \left| \frac{1}{2} \right| 984 \text{ 50} \\ \quad \quad \quad 1\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 984 \text{ 50} \\ 246 \text{ 12 } \frac{1}{2} \\ \hline \end{array}$$

$$\text{Ans. } \text{£}12|30|62 \frac{1}{2}$$

$$\begin{array}{r} \text{£} \text{ cts.} \\ (10) \quad \frac{1}{2} \left| \frac{1}{2} \right| 1650 \text{ 75} \\ \quad \quad \quad 1\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 1650 \text{ 75} \\ 825 \text{ 37 } \frac{1}{2} \\ \hline \end{array}$$

$$\text{Ans. } \text{£}24|76|12 \frac{1}{2}$$

DISCOUNT.

EXAMPLES.

(2) Thus, 2mo. at 6 per cent. per an. = $\$1\frac{1}{2}$ int. of \$100
 $+100$

$101\frac{1}{2}$ amt. of do.

Then as $\$101\frac{1}{2} : \$850 :: \$100 : \$837\ 48\text{cts. } 8\text{m.} +$
 Ans.

(3) Thus, 9mo. at 6 per cent. per an. = $\$4\frac{1}{2}$ int. of \$100
 100

$104\frac{1}{2}$ amt. of 100

Then as $\$104\frac{1}{2} : \$645 :: \$100 : \$617\ 22\text{cts. } 4\text{m.}$
 present worth. $645\ 00\ 0$

Ans. $\$27\ 77\ 6$

(4) $\begin{array}{r} \text{Yrs.} \\ 4 \\ 5 \\ \hline \end{array}$

20 int. of \$100 for 4 yrs.
 100

$\$120$ amt. of do.

Then as $\$120 : \$775\ 50\text{cts.} :: \$100 : \$646\ 25\text{cts.}$ Ans.

(5) 8mo. at 6 per cent. per an. = $\$4$ int. of \$100
 100

$\$104$ amt. of do.

Then $\$104 : \$580 :: \$100 : \$557\ 69\text{cts.} +$ Ans.

DISCOUNT.

107

(6)

<i>Yrs.</i>
3
<u>4½</u>
12
<u>1½</u>
13½ int. of 100
<u>100</u>
\$113½ amt. of do.

Then as \$113½ : \$954 :: \$100 : \$840 52cts. 8m. Ans.

(7) Thus, 15 mo. = 1½ yr. at 7 per cent. per annum = \$8½ the discount of 100.

\$108½ amt.

Then \$108½ : \$205 :: \$100 : \$188 50cts. 5m. present worth.

Ans. \$16 49 5

(8)

<i>mo.</i>	<i>£</i>
6	<u>½ 5</u>
3	<u>½ 2½</u>
	<u>1½</u>
	3½ discount of 100
	<u>100</u>
	\$103½ amt.

Then as \$103½ : \$775 :: \$100 : \$746 98cts. 7m. Ans.

DISCOUNT.

<p>(9) $\begin{array}{r} \text{mo. } \\$ \\ 6 \quad \frac{1}{2} \quad 6 \\ \hline 3 \quad \frac{1}{2} \quad 3 \\ 1 \quad \frac{1}{2} \quad 1\frac{1}{2} \\ \hline \end{array}$</p> <p>5 dis. of 100 for 10mo. $\frac{7\frac{1}{2}}{100}$ dis. of 100 for 15 mo.</p> <p>$\frac{100}{\\$105 \text{ amt.}}$</p>	<p>Again $\begin{array}{r} \text{mo. } \\$ \\ 3 \quad \frac{1}{4} \quad 6 \\ \hline \end{array}$</p> <p>$\frac{1\frac{1}{2}}{100}$</p> <p>$\frac{107\frac{1}{2}}{1005}$</p> <p>$\frac{475}{\text{Rem. } 530}$</p>
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Then as 105 : 475 :: 100 : 452 38. Ans. to first part.
 Again 107 $\frac{1}{2}$: 530 :: 100 : 493 02 4

Ans. $\$945 \ 40 \ 2m.$

<p>(10) $\begin{array}{r} \\$ \\ 2260 \\ 6 \\ \hline \end{array}$</p> <p>135 60 int. for 1 yr. $\frac{5}{100}$</p> <p>$\\$678 \ 00$ int. for 5 yrs.</p>	<p>Again $\begin{array}{r} \\$ \\ 6 \\ 5 \\ \hline \end{array}$</p> <p>30 dis. of 100 $\frac{100}{100}$</p> <p>$\\$130 \text{ amt.}$</p>
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Then $\$130 : \$2260 :: \$100 : \$1738 \ 46cts. \ 2m. \text{ pres. wr.}$
 $\frac{2260 \ 00 \ 0}{521 \ 53 \ 8 \text{ discount.}}$

$\frac{678 \ 00 \ 0 \text{ interest.}}$

Ans. $\$156 \ 46 \ 2$

EQUATION.

109

$$\begin{array}{r} \text{\pounds} \\ (12) \quad 782 \\ \quad \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{\pounds}31|28 \\ \quad \quad 20 \\ \hline \end{array}$$

$$\begin{array}{r} s.5|00 \\ \quad \quad 12 \\ d.7|20 \\ \hline \end{array}$$

Ans. $\text{\pounds}31 \text{ } 5s. \text{ } 7d.$

$$\begin{array}{r} \$ \\ (13) \quad 476 \\ \quad \quad 3 \\ \hline \end{array}$$

Ans. $\$14|28\text{cts.}$

$$\begin{array}{r} \$ \\ (14) \quad 1385 \\ \quad \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 83 \text{ } 10 \text{ dia.} \\ 1385 \text{ } 00 \\ \hline \end{array}$$

Ans. $\$1301 \text{ } 90\text{cts.}$

$$\begin{array}{r} \$ \\ (15) \quad 650 \\ \quad \quad 4\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 2600 \\ 325 \\ \hline \end{array}$$

$$\begin{array}{r} 29|25 \text{ discount.} \\ 650|00 \\ \hline \end{array}$$

Ans. $\$620|75$



EQUATION.

EXAMPLES.

$$\begin{array}{r} \$ \\ (2) \quad 250 \times 6 = 1500 \\ \quad \quad 250 \times 8 = 2000 \\ \hline \end{array}$$

$$\begin{array}{r} 500 \\ \hline \end{array}$$

$$\begin{array}{r} 3500 \div 500 = 7mo. \text{ } Ans. \\ \hline \end{array}$$

$$\begin{array}{rcl}
 \text{(3)} & \text{£} & \\
 & 100 \times 2 = 200 & \\
 & 100 \times 4 = 400 & \\
 & 100 \times 6 = 600 & \\
 \hline
 & 300 & 1200 \div 300 = 4\text{mo.} \quad \text{Ans.} \\
 \hline
 \end{array}$$

$$\begin{array}{rcl}
 \text{(4)} & \$ & \\
 & 100 \times 3 = 300 & \\
 & 200 \times 5 = 1000 & \\
 & 250 \times 8 = 2000 & \\
 \hline
 & 550 & 3300 \div 550 = 6\text{mo.} \quad \text{Ans.} \\
 \hline
 \end{array}$$

BARTER.

EXAMPLES.

- (1) Thus $2\text{cwt. } 2\text{qrs. } 13\text{lbs.} = 293\text{lbs.} \times 9\text{cts.} = 2637\text{cts.}$
Then as $25\text{cts.} : 2637\text{cts.} :: 1\text{lb.} : 105\text{lbs. } 7\frac{1}{2}\text{oz.}$ Ans.
- (2) Thus $2500\text{lbs.} \times 4\frac{1}{2}\text{cts.} = \$112 \text{ } 50\text{cts.}$
Then as $\$1 \text{ } 30\text{cts.} : \$112 \text{ } 50\text{cts.} :: 1\text{lb.} : 86\text{lbs. } 8\text{oz.} +$
Ans.
- (3) Thus $108\text{lbs.} \times \$1 \text{ } 25\text{cts.} = \$135 \text{ } 00\text{cts.}$
Then as $8\frac{3}{4}\text{cts.} : \$135 \text{ } 00\text{cts.} :: 1\text{lb.} : 1542\text{lb. } 13\text{oz.} +$
Ans.
- (4) First, as $1\text{cwt.} : \$3 \text{ } 75\text{cts.} :: 14\text{cwt. } 3\text{qrs. } 26\text{lbs.} : \56
18cts. 3m. the value of the rice.
Then as $\$1 \text{ } 87\frac{1}{2}\text{cts.} : \$56 \text{ } 18\text{cts. } 3\text{m.} :: 1\text{lb.} : 29\text{lbs. } 15\text{oz.} +$ Ans.
- (5) Thus $2\text{cwt. } 3\text{qrs. } 17\text{lbs.} = 325\text{lbs.} \times 12\frac{1}{2}\text{cts.} = \$40 \text{ } 62\frac{1}{2}\text{cts.}$
Then as $37\text{cts.} : \$40 \text{ } 62\frac{1}{2}\text{cts.} :: 1\text{yd.} : 109\text{yds. } 3\text{qrs.}$
Ans.
- (6) Thus $357\text{bu.} \times 93\text{cts.} = \$332 \text{ } 01\text{ct.}$
Then $45\text{cts.} : \$332 \text{ } 01\text{ct.} :: 1\text{bu.} : 737\text{bu. } 3\text{pe} +$ Ans.

(7) Thus 15cwt. 0qr. 27lbs. = 1707lbs. \times 20cts. = \$341 40cts.

Then \$9 50cts. : \$341 40cts. :: 1cwt. : 35cwt. 3qrs. 20lbs. + Ans.

(8) Thus 95yds. \times 5pie. = 475yds. \times 23cts. = \$109 25cts.
And 32 sheep \times 250 = 80 00

\$29 25 rem.

Then as \$1 50cts. : \$29 25cts. :: 1cwt. : 19cwt. 2qrs. Ans.

(9) Thus 1286yds. at 43cts. per yd. = \$552 98cts.
And 2cwt. 1qr. 13lbs. = 265lbs. \times 14cts. = 37 10

Ans. \$515 88

(10) Thus 570lbs. \times 7cts. = \$39 90cts.

Then as 11½cts. : \$39 90cts. :: 1lb. : 346lbs. 15oz. + Ans.

(11) Thus 112cwt. \times \$5 04cts. = \$564 60cts.

Then as 1208yds. : \$564 60cts. :: 1yd. : 46cts. 7m. + Ans.

(12) Thus 750lbs. \times \$1 08cts. = \$810 00cts.

Then 8cts. : \$810 00cts. :: 1lb. : 10125lbs. = 90cwt. 1qr. 17lbs. Ans.

(13) Thus 2hhds. = 126gals. \times 75cts. = \$94 50cts.

Then 56yds. : \$94 50cts. :: 1yd. : \$1 68½cts. Ans.

(14) Thus 2108lbs. \times 10cts. = \$210 80cts.

And 31doz. \times 11½cts. = +3 56½

\$214 36½ amt. of the whole.
-135 25

\$79 11½ rem.

Then as \$1 58cts. : \$79 11½cts. :: 1bar. : 50½½bar. Ans.

(15) Thus $17\text{cwt.} \times 4 \times 28 = 1904\text{lbs.} \times 13\frac{1}{2}\text{cts.} = \$257\ 04\text{cts.}$
 value of A.'s goods.

And 1200lbs. at the rate of $\$14$ per cwt. $= 150\ 00$
 balance of B.'s goods.

Ans. A. is to receive $\$107\ 04$

(16) Thus 25cts.

-20

5 gain on 20cts.

Then as $5\text{cts.} : 20\text{cts.} :: 5\text{cts.} : 20\text{cts.}$ Ans.

(17) Thus $50\text{cts.} : 56\text{cts.} :: 31\frac{1}{2}\text{cts.} : 35\text{cts.}$ Ans.

(18) Thus 105 tons at $\$10\ 03$ per ton $= \$1053\ 15\text{cts.}$
 value of the iron.

pays cash $650\ 00$

250lbs. at 20cts. per $\text{lb.} = 50\ 00$

$10\text{ loads} \times 15\text{bu.} \times 45\text{cts.} = 67\ 50$

And 85gals. at the rate of $\$75$ per $\text{hhd.} = 101\ 19$

$-868\ 69$

$1053\ 15$

Rem. unpaid $\$184\ 46$

Then $30\text{cts.} : \$184\ 46\text{cts.} :: 1\text{lb.} : 615\text{lbs.}$ nearly.
 Ans.



LOSS AND GAIN.

EXAMPLES.

(2) Thus 10cts.

-8

$-$

2

Then $1\text{lb.} : 1763\text{lbs.} :: 2\text{cts.} : \$35\ 26\text{cts.}$ Ans.

(3) Thus \$5 25cts.
 —5 00

25 gained per barrel.

Then 1bar. : 363bar. :: 25cts. : \$90 75cts. Ans.

(4) Thus \$3 90cts.
 —3 75

15 gained per yard.

Then 1yd. : 150yds. :: 15cts. : \$22 50cts. Ans.

(5) First, 1cwt. : \$7 50cts. :: 18cwt. 2qrs. : \$138 75cts.
 the cost.

Then 1cwt. : \$7 75cts. :: 18cwt. 2qrs. : \$143 37½cts.
 sold for.

Ans. gained \$4 62½

(6) First, 210 reams × \$2 62½ = \$551 25cts. the cost.
 And 210 reams × \$2 87½ = \$603 75cts. sold for.

Ans. \$52 50 gained.

(7) Thus, sold for \$20 75cts.
 cost 18 12½

gained \$2 62½ Ans.

(8) First, 50cts.
 —45

5

Then 1bu. : 150bu. :: 5cts. : \$7 50cts. 1st Ans.

Again, 50cts. : 5cts. :: \$100 : \$10. 2d Ans.

(9) First, $760\text{lbs.} \times 90\text{cts.} = \$684\ 00$ sold for.
810 00 cost.

810 00 cost.

Lost 126 00 1st Ans.

Then $\$810 : \$126 :: \$100 : \$15\frac{1}{2}$. Ans.

(10) First, 37½cts.

32

51

Then $37\frac{1}{2}\text{cts.} : 5\frac{1}{2}\text{cts.} :: \$100 : \$14\frac{1}{2}$ per cent. Ans.

(11) Thus $1s. : 2d. :: £100 : £16\frac{2}{3}$ per cent. Ans.

(12) Thus \$13 75cts.* First cost of each piece.

3 12½ for dyeing.

\$16 87½ whole cost.

Then \$100 : \$112 :: \$16 87½cts. : \$18 90cts. Ans.

(13) Thus $1\text{ cwt.} : 1\text{ lb.} :: \$7 + \$3 : 8\text{ cts. } 9\text{ m.}$ Ans.

(14) Thus, paid 23cts. per lb.

Sold it for 19

Lost 4cts. per lb.

Then as 1lb. : 702lbs. :: 4cts. : \$28 08cts. Ans.

(15) Thus \$2 23cts. : \$2 75cts. :: \$110 : \$135 65cts.

And $\$135 \text{ 65cts.} - \$100 = \$35 \text{ 65cts.} = 35\frac{1}{2}$ nearly.
Ans.

Ans.

(16) Thus \$100 : \$125 :: \$2 10cts. : \$2 62½cts. what
1 box sold for.

Then as \$3 50cts. price of 1cwt. : \$2 62½cts. price
of 1 box :: 112lbs. : 84lbs. Ans.

- (17) First, $16\text{pie.} \times \$14 = \224 the prime cost.
 And $5\text{pie.} \times \$17 = \85
 $6\text{pie.} \times \$15 = \90

\$175 received back again.

Then as $\$100 : \$112 :: \$224 : \250 88cts. price of
 the whole with rate per cent. added.—175 00

5)75 88 price of the
 5 pieces.

Ans. \$15 17 6 per pie.

- (18) Thus $\$500 - \$410 = \$90$ gain on the whole.
 Then as $372\text{lbs.} : 1\text{lb.} :: \$90 : 24\text{cts. } 1\text{m.} +$ Ans.

- (19) Thus $\$1 : \$100 :: 5\text{cts.} : \$5$ 00 the Ans.

- (20) First, $\$1$ 05cts. $\times 510 = \$535$ 50cts. prime cost.
 And $\$1$ 30cts. $\times 510 = \$663$ 00cts. sold for.

mo.	\$
31	6
1	1 50
1	100 00
	\$101 50

\$101 50

Then $\$101$ 50cts. : $\$100 :: \$663 : \$653$ 20cts. +
 Hence $\$653$ 20cts. — $\$535$ 50cts. = $\$117$ 70cts. Ans.

FELLOWSHIP.

EXAMPLES.

CASE 1.

(2) Thus D.'s stock \$500
 E.'s 400
 F.'s 300

Sum 1200

Then as $\frac{\$}{1200} : \frac{\$}{500} :: \frac{\$}{300} : \frac{\$}{125} = \text{D.'s}$
 And $1200 : 400 :: 300 : 100 = \text{E.'s}$
 And $1200 : 300 :: 300 : 75 = \text{F.'s}$ } Ans.

(3) Thus A. \$1200
 B. 500
 C. 700

Whole debt \$2400

Then as $\frac{\$}{2400} : \frac{\$}{1200} :: \frac{\$}{1800} : \frac{\$}{900} = \text{A.'s}$
 as $2400 : 500 :: 1800 : 375 = \text{B.'s}$
 as $2400 : 700 :: 1800 : 525 = \text{C.'s}$ } Ans.

\$1800 proof.

(4) Thus A. had 50 cattle.
 B. 80
 C. 70

Sum 200

Then as $\frac{\text{cattle.}}{200} : \frac{\text{cattle.}}{50} :: \frac{\$}{60} : \frac{\$}{15} = \text{A.'s}$
 as $200 : 80 :: 60 : 24 = \text{B.'s}$
 as $200 : 70 :: 60 : 21 = \text{C.'s}$ } Ans.

\$60 proof.

(5)	Thus, to A.	\$ 120	
	B.	250	75
	C.	300	
	D.	208	25

Sum 879 00

$$\begin{array}{l} \text{Then} \\ \text{As } \$879 : \$650 \end{array} \left\{ \begin{array}{l} :: 120 : 88 \text{ 73} + = \text{A.'s sh.} \\ :: 250 \text{ 75} : 185 \text{ 42} + = \text{B.'s sh.} \\ :: 300 : 221 \text{ 84} + = \text{C.'s sh.} \\ :: 208 \text{ 25} : 153 \text{ 99} + = \text{D.'s sh.} \end{array} \right\} \text{Ans.}$$

(6) Thus A. is to have 1 portion.

B.	2
C.	6

9 sum of the portions.

Then as $\left\{ \begin{array}{l} p. \quad p. \quad \$ \quad \$ \\ 9 : 1 :: 900 : 100 = \text{A.'s share.} \\ 9 : 2 :: 900 : 200 = \text{B.'s share.} \\ 9 : 6 :: 900 : 600 = \text{C.'s share.} \end{array} \right\} \text{Ans.}$

(7) Thus, he owes to A. $\begin{matrix} \$ \\ 250 & 50 \\ 500 & 00 \\ 349 & 50 \end{matrix}$

Sum 1100 00

$$\begin{array}{l} \text{Then} \\ \text{As } 1100 : 960 :: \left\{ \begin{array}{l} 250 \text{ } 50 : 218 \text{ } 58 \text{ } 1 + \text{A.'s} \\ 500 \text{ } 00 : 436 \text{ } 36 \text{ } 3 + \text{B.'s} \\ 349 \text{ } 50 : 305 \text{ } 01 \text{ } 8 + \text{C.'s} \end{array} \right\} \text{Ans.} \end{array}$$

EXAMPLES.

CASE 2.

$$\begin{array}{rcl}
 \text{(1)} & \text{Thus} & \begin{array}{l} 88 \times 3 = 264 \\ 120 \times 4 = 480 \\ 300 \times 6 = 1800 \end{array}
 \end{array}$$

Sum of stocks and time 2544

$$\begin{array}{rcl}
 \text{Then as } \$2544 : & \left\{ \begin{array}{l} 264 :: 184 : 19 \text{ } 09 \text{ } 4 = \text{L.'s} \\ 480 :: 184 : 34 \text{ } 71 \text{ } 6 = \text{M.'s} \\ 1800 :: 184 : 130 \text{ } 18 \text{ } 8 = \text{N.'s} \end{array} \right. & \text{Ans.}
 \end{array}$$

$$\begin{array}{rcl}
 \text{(2)} & \begin{array}{rcl} \$ & m. & \$ \\ 580 \times 3 = & 1740 & \\ + 100 & & \\ \hline 680 \times 9 = & 6120 & \\ \hline \text{A.'s product} & 7860 & \end{array} & \begin{array}{rcl} \$ & m. & \$ \\ 480 \times 3 = & 1440 & \\ - 300 & & \\ \hline 180 \times 2 = & 360 & \\ + 500 & & \\ \hline 680 \times 3 = & 2040 & \\ - 400 & & \\ \hline 280 \times 1 = & 280 & \\ + 1000 & & \\ \hline 1280 \times 3 = & 3840 & \\ \hline \text{C.'s product} & 7960 & \end{array}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Then as } \$28420 : & \left\{ \begin{array}{l} 7860 :: 2108 \text{ } 44 : 583 \text{ } 12 \text{ } 2 + \text{A.'s} \\ 12600 :: 2108 \text{ } 44 : 994 \text{ } 76 \text{ } 9 + \text{B.'s} \\ 7960 :: 2108 \text{ } 44 : 590 \text{ } 53 \text{ } 7 + \text{C.'s} \end{array} \right. & \text{Ans.}
 \end{array}$$

EXCHANGE.

DOMESTIC EXCHANGE.

- (1) Thus, £63 14s. 6d. = $15294d. \div 72d.$ a dollar in Virginia = \$212 41½cts. Ans.

- (2) Thus, £230 10s. 7d. = $55327d. \div 96d.$ a dollar in New-York and N. Carolina = \$576 32cts. 2m, Ans.

- (3) Thus, \$150
90d. = a doll. Penn. cur.

12)13500d.

2|0)112|5

£56 5s. Ans.

- (4) Thus, \$377 40cts.
72d. = a doll. Mass. cur.

754 80
26418 0

12)27172 80

2|0)226|4 4d.

£113, 4s. 4d. Ans.

- (5) Thus, \$389 45cts.
56d. = a doll. in Georgia.

233670
194725

12)21809|20

2|0)181|7 5

£90 17s. 5d.

FOREIGN EXCHANGE.

EXAMPLES.

- (2) Thus £1 : £76 :: \$4 10cts. = £1 Irish : \$311 60
cts. Ans.
- (3) Thus \$1 24cts. = 1 milrea : \$532 33cts. :: 1m. :
429m. 298reas. + Ans.
- (4) Thus 66cts. : \$1869 :: 1ru. : 2831 $\frac{2}{11}$ ru. Ans.
- (5) Thus 1g. : 165g. :: 39cts. : \$64 35cts. Ans.
- (6) Thus 33cts. 5m. = 1m. b. : \$280 58cts. 5m. :: 1m. l.
: 837 $\frac{3}{4}$ m. b. Ans.
- (7) Thus 1li. : 562li. :: 18cts. 5m. = 1li. : \$103 97cts.
Ans.
- (8) Thus 10cts. = 1rial plate : \$463 :: 1rial : 4630rials.
Ans.
- (9) Thus 1flo. : 40cts. :: 591flo. 17st. : \$236 74cts.
Or 1st. : 2cts. :: 591flo. 17st. : \$236 74cts.
Then \$100 : \$160 :: \$236 74cts. : \$378 78cts. +
Ans.
- (10) Thus as 100cr. + 25 : 100b. :: 2464m. b. : 1971m. b.
3sch. 2 $\frac{3}{4}$ pen. Ans.
- (11) Thus 1cr. : 32 $\frac{1}{2}$ d. :: 2000cr. : £270 16s. 8d. Ans.
- (12) Thus as 1pi. = 8ri. : 36d. :: \$1876 6ri. = 16766ri.
: £314 7s. 3d. Ans.
- (13) Thus 1pez. = 20sol. : 54d. :: 3940pez. 15sol. : £886
13s. 4 $\frac{1}{2}$ d. Ans.
- (14) Thus 1ru. : 4s. 3d. :: 2586ru. : £549 10s. 6d. Ans.
- (15) First £1 : £450 15s. :: 34s. 6d 186610 $\frac{1}{2}$ pence.
Or 20s. : 9015s. :: 414d. : 186610 $\frac{1}{2}$ pence Flemish,
or groots.
Then 50st. = 100d. : 186610 $\frac{1}{2}$ d. :: 1ru. : 1866ru. 10 $\frac{1}{2}$
cop. Ans.
- (16) Thus as £108 6s. 8d. Irish : £100str. :: £813 3s.
6d. : £750 12s. 6d. Sterling. Ans.

(17) First $20s. : 33s. 6d. :: 5s. : 8s. 4\frac{1}{2}d.$
Then $5s. : 8s. 4\frac{1}{2}d. :: 32\frac{1}{2}d. : 54\frac{7}{8}d.$ Flemish. Ans.

(18) Thus $32\frac{1}{2}d. : 54\frac{7}{8}d. :: 5s. : 8s. 4\frac{1}{2}d.$
Then as $5s. : 8s. 4\frac{1}{2}d. :: 20s. : 33s. 6d.$ Ans.

(19) Thus $\begin{array}{c} s. \quad s. \quad d. \\ 5 \quad 1 \quad 33 \end{array}$

$8 \ 4\frac{1}{2}$ = value of a crown at that rate.

Then $8s. 4\frac{1}{2}d. : 5s. :: 54\frac{7}{8}d. : 32\frac{1}{2}d.$ Ans.

(20) Thus $32\frac{1}{2}d. : 32d. :: 36s. 6d. : 36s. 2\frac{2}{3}d.$ Ans.

(21) Thus $51d. : 53d. :: 42d. : 43\frac{1}{7}d.$ Ans.



VULGAR FRACTIONS.

REDUCTION OF VULGAR FRACTIONS.

EXAMPLES.

CASE 1.

(2) Numer. $108)144(1$
 108

Common measure $36)108(3$
 108

Then $36)_{144}^{108} = \frac{3}{4}$. Ans.

(4) Numer. $126)234(1$
 126

$108)126(1$
 108

Common measure $18)108(6$
 108

Then $18)_{234}^{126} = \frac{7}{13}$. Ans.

VULGAR FRACTIONS.

CASE 2.

$$45 \times 3 + 2 = 137. \text{ Ans.}$$

(2)

$$\text{Thus } 1564 \times 5 + 3 = 7823. \text{ Ans.}$$

(3)

CASE 3.

$$\text{Thus } 67 \div 7 = 9\frac{4}{7}. \text{ Ans.}$$

(2)

$$\text{Thus } 16 \overline{) 384} (24\frac{2}{3}. \text{ Ans.}$$

(3)

$$\begin{array}{r} 32 \\ \hline 44 \\ 32 \\ \hline 12 \\ \hline \end{array}$$

CASE 4.

$$\text{(2) Thus } 6 \times 8 \times 11 \times 13 = 6864 \text{ numer.} = \frac{672}{1071}. \text{ Ans.}$$

$$\text{And } 7 \times 9 \times 12 \times 17 = 12852 \text{ denom.}$$

$$\text{(3) Thus } 7 \times 15 \times 8 \times 6 = 5040 \text{ numer.} = \frac{420}{2117}. \text{ Ans.}$$

$$\text{And } 12 \times 19 \times 11 \times 13 = 32604 \text{ denom.}$$

CASE 5.

$$\text{(2) Thus } 5) 5 \quad 20 \quad 10 \quad 15 \text{ the denominators.}$$

$$\begin{array}{r} 2 \overline{) 1 \quad 4 \quad 2 \quad 3} \\ \hline \end{array}$$

$$\begin{array}{r} 1 \quad 2 \quad 1 \quad 3 \\ \hline \end{array}$$

$$\begin{array}{l} \text{Then } 5 \times 2 \times 1 \times 2 \times 1 \times 3 = 60 \text{ common denom.} \\ \text{Then the com. denom. } \left. \begin{array}{l} 60 \div 5 = 12 \times 4 = 48 \\ 60 \div 20 = 3 \times 9 = 27 \\ 60 \div 10 = 6 \times 7 = 42 \\ 60 \div 15 = 4 \times 4 = 16 \end{array} \right\} \text{ numer.} \end{array}$$

$$\text{That is } \frac{48}{60} \frac{27}{60} \frac{42}{60} \frac{16}{60}. \text{ Ans.}$$

- (3) Thus
- $2)10\ 2\ 9$
- the denom.

$$\begin{array}{r} 5\ 1\ 9 \\ \hline \end{array}$$

Then $2 \times 5 \times 1 \times 9 = 90$ common denom.

$$\left. \begin{array}{l} 90 \div 10 = 9 \times 9 = 81 \\ 90 \div 2 = 45 \times 1 = 45 \\ 90 \div 9 = 10 \times 5 = 50 \end{array} \right\} \text{numerator.}$$

That is $\frac{81}{90} \frac{45}{90} \frac{50}{90}$. Ans.

CASE 6.

- (2) First $1\text{ lb. troy} = 240\text{wt.}$ therefore $\frac{3}{4}$ of $\frac{1}{240} = \frac{3}{1920} = \frac{1}{640}\text{ lb.}$ Ans.
- (3) Thus $3 \times 1 \times 1 = 3$
And $8 \times 4 \times 4 = 128$. Ans.
- (4) Thus $1\text{ hhd.} = 504\text{pts.}$ therefore $\frac{4}{5}$ of $\frac{1}{504} = \frac{4}{2520} = \frac{1}{630}\text{ hhd.}$ Ans.

CASE 7.

- (2) Thus $2 \times 112 = 224$ the numer. and $252 \times 1 = 252$ the denom. $= \frac{224}{252} = \frac{8}{9}\text{ lb.}$ Ans.
- (3) $\frac{6}{1000}$ of $\text{£}1 = \frac{6}{1000}$ of $\frac{240}{1} = \frac{1440}{1000} = \frac{36}{125}\text{d.}$ Ans.

CASE 8.

- (2) Thus $\frac{1}{4}$ of a shilling $= \frac{1}{4}$ of $\frac{1}{2} = \frac{1}{4} = 10\frac{1}{2}\text{d.}$ Ans.
- (3) Thus $\frac{1}{2}$ of a day $= \frac{1}{2}$ of $\frac{24}{1} = \frac{24}{2} = 12\text{ hrs.}$ Ans.
- (4) Thus $\frac{5}{16}$ of an acre $= \frac{5}{16}$ of $\frac{1}{4}$ of $\frac{1}{16} = \frac{5}{1024}$ perches $= 1\text{r. } 10\text{p.}$ Ans.

CASE 9.

- (2) Thus $5\text{s. } 4\text{d.} = 64\text{d.}$ and $\text{£}1 = 240\text{d.}$ therefore $\frac{64}{240} = \frac{4}{15}\text{£.}$ Ans.

- (3) Thus $6mo. 2w.=26w.$ and $1yr.=52w.$ therefore $\frac{26}{52}$ of $1yr.=\frac{1}{2}yr.$ Ans.
- (4) Thus $2qrs. 3na.=11na.$ and $1yd.=16na.$ therefore $\frac{11}{16}yd.$ is the Ans.

ADDITION OF VULGAR FRACTIONS.

EXAMPLES.

(2) Thus $\frac{3}{13} + \frac{4}{13} + \frac{5}{13} + \frac{1}{13} = \frac{13}{13} = 1.$ Ans.

(3) Thus $\frac{4}{7} + \frac{3}{7} + \frac{9}{7} = \frac{16}{7} = 1\frac{9}{7}.$ Ans.

(4) Thus $5) 10$

$$1 \quad 2 = 10 \text{ common denom.}$$

$$\text{And } 10 \div 5 \times 2 = 4 \quad \left. \begin{array}{l} 10 \div 10 \times 5 = 5 \end{array} \right\} \text{numerator.}$$

Whence $\frac{4}{10} + \frac{5}{10} = \frac{9}{10}.$ Ans.

(5) Thus $3\frac{1}{4} = \frac{13}{4}, 8\frac{2}{3} = \frac{26}{3},$ and $4 \times 7 \times 9 = 252$ common denom.

$$\text{And } 252 \div 4 \times 13 = 819 \quad \left. \begin{array}{l} 252 \div 7 \times 26 = 2088 \\ 252 \div 9 \times 4 = 112 \end{array} \right\} \text{numerator.}$$

Whence $\frac{819}{252} + \frac{2088}{252} + \frac{112}{252} = \frac{3019}{252} = 11\frac{247}{252}.$ Ans.

(6) Thus $\frac{3}{8}$ of $\frac{5}{6} = \frac{15}{48} = \frac{5}{16},$ and $\frac{2}{4}$ of $\frac{7}{12} = \frac{14}{24} = \frac{7}{12}.$
Then $8) 16 \quad 24$

$$2 \quad 3 = 48 \text{ common denom.}$$

$$\text{And } 48 \div 16 \times 5 = 15 \quad \left. \begin{array}{l} 48 \div 24 \times 7 = 14 \end{array} \right\} \text{numerator.}$$

Whence $\frac{15}{48} + \frac{14}{48} = \frac{29}{48}.$ Ans.

(7) Thus $\frac{1}{4}$ of $\frac{4}{5}$ of $\frac{40}{100} = \frac{16}{100} = 53\frac{1}{2}p. = 1r. 13\frac{1}{2}p.$

And $\frac{1}{10}$ of $\frac{40}{100} = \frac{4}{100} = 28p.$

Whence $1R. 13\frac{1}{2}p.$

$$0 \quad 28$$

Ans. $2 \quad 1\frac{1}{2}$

MULTIPLICATION OF VULGAR FRACTIONS.

EXAMPLES.

- (2) $\frac{2}{10}$ by $\frac{1}{3}$ thus $2 \times 1 = 2$
 $10 \times 3 = 30 = \frac{2}{30} = \frac{1}{15}$. Ans.
- (3) Thus $6\frac{2}{4} = 2^{\frac{2}{1}}$ by $\frac{1}{7} = 26 \times 1 = 26$
 $4 \times 7 = 28 = \frac{26}{28} = \frac{13}{14}$. Ans.
- (4) $4\frac{3}{4} = 1^{\frac{3}{1}}$ by $\frac{2}{3} = 19 \times 2 = 38$
 $4 \times 3 = 12 = 3\frac{2}{12} = 3\frac{1}{3}$. Ans.

SUBTRACTION OF VULGAR FRACTIONS.

EXAMPLES.

- (2) Thus $\frac{1}{4}$ of $\frac{1}{4} = \frac{1}{16}$ whence $\frac{1}{20} - \frac{1}{28}$.
 $4)20 \ 28$
 $5 \ 7 = 140$ common denom.
 $140 \div 20 \times 19 = 133$ } numer.
 $140 \div 28 \times 1 = 5$ }
 Whence $\frac{133}{140} - \frac{5}{140} = \frac{128}{140} = \frac{32}{35}$. Ans.
- (3) Thus $1 \times 14 = 14$ common denom.
 And $14 \div 1 \times 5 = 70$ } numer.
 $14 \div 14 \times 8 = 8$ }
 Whence $\frac{70}{14} - \frac{8}{14} = \frac{62}{14} = 4\frac{3}{7}$. Ans.
- (4) Thus $\frac{2}{3}$ of a league $= \frac{2}{3}$ of 3 miles $= 2$ miles.
 And $\frac{1}{10}$ of a mile $= \frac{1}{10}$ of 8 furlongs $= \frac{8}{10} = 5\frac{6}{10}$ fur-
 longings $= 5$ furlongs 24 poles.
 Therefore $2m. - 5fur. 24po. = 1m. 2fur. 16po.$ Ans.
- (5) Thus $5\frac{2}{3} = \frac{17}{3}$ and $2\frac{2}{3} = \frac{8}{3}$ therefore $4 \times 3 = 12$ com. d.
 And $12 \div 4 \times 23 = 69$ } numer.
 $12 \div 3 \times 8 = 32$ }
 Whence $\frac{69}{12} - \frac{32}{12} = \frac{37}{12} = 3\frac{1}{12}$. Ans.
- (6) Thus $\frac{2}{3}$ of $\frac{7}{10} = \frac{14}{15}$ and $\frac{1}{4}$ of $\frac{3}{5} = \frac{3}{20}$.
 And $4)48 \ 20$
 $12 \ 5 = 240$ common denom.
 And $240 \div 48 \times 14 = 70$ } numer.
 $240 \div 20 \times 3 = 36$ }
 Whence $\frac{70}{240} - \frac{36}{240} = \frac{34}{240} = \frac{17}{120}$. Ans.

DIVISION OF VULGAR FRACTIONS.

EXAMPLES.

- (2) $\frac{5}{8}$ by $\frac{3}{4}$ thus $\frac{1}{2}(\frac{5}{2}) = \frac{5}{4}$. Ans.
- (3) $6\frac{2}{3} = \frac{32}{5} \div \frac{1}{3}$ thus $\frac{3}{1}(\frac{32}{5}) = 19\frac{4}{5}$. Ans.
- (4) Thus $\frac{3}{4}$ of $\frac{3}{4} = \frac{9}{16}$ and $\frac{1}{2}$ of $\frac{3}{4} = \frac{3}{8}$.
Then $\frac{9}{16} \div \frac{3}{8}$ thus $\frac{9}{16}(\frac{8}{3}) = 1\frac{1}{2}$. Ans.
- (5) $\frac{1}{8}$ by $\frac{3}{4}$ thus $\frac{1}{3}(\frac{4}{8}) = \frac{1}{6}$. Ans.
- (6) $\frac{3}{4}$ of $\frac{7}{8} = \frac{21}{32}$ and $\frac{1}{2}$ of $\frac{1}{4} = \frac{1}{8}$.
Then $\frac{21}{32}$ by $\frac{1}{8}$ thus $\frac{21}{32}(\frac{8}{1}) = 6\frac{3}{4}$. Ans.
- (7) $\frac{1}{2}$ of $17\frac{1}{2} = \frac{1}{2}$ of $\frac{35}{2} = \frac{35}{4}$.
Then $\frac{35}{4} \div \frac{3}{4}$ thus $\frac{35}{4}(\frac{4}{3}) = 11\frac{1}{3}$. Ans.
- (8) Thus $\frac{3}{4}$ of $91\frac{13}{16} = \frac{3}{4}$ of $\frac{1461}{16} = \frac{21915}{64}$.
And $\frac{21915}{64} \div \frac{103}{32}$ thus $\frac{21915}{64}(\frac{32}{103}) = 105\frac{15}{103}$.
Ans.

RULE OF THREE IN VULGAR FRACTIONS.

EXAMPLES.

- (2) Thus $3\frac{1}{2}yds. = \frac{7}{2}$ and $9\frac{3}{4}s. = \frac{39}{4}$ and $4\frac{1}{2}yds. = \frac{9}{2}$.
Then we have $\frac{7}{2} : \frac{39}{4} :: \frac{9}{2} : 14s. 3d.$
For $\frac{39}{4} \times \frac{1}{2} = \frac{39}{8}$ thus $\frac{39}{8} \div \frac{7}{2} = 6\frac{3}{8} = 6s. 4\frac{1}{2}d.$ Ans.
- (3) Thus $\frac{5}{8} : \frac{3}{4} :: \frac{3}{4} : 12yds.$
For $\frac{3}{4} \times \frac{3}{4} = \frac{9}{16}$ thus $\frac{9}{16} \div \frac{5}{8} = 6\frac{3}{10}yds.$ Ans.
- (4) Thus $27\frac{1}{2} \times 4pe. = 111yds.$ and $15\frac{1}{2}s. = 15s. 8d.$
Then say as in whole numbers, $1yd. : 111yds. :: 15s. 8d. : £86 19s.$
For $15s. 8d. = 188d. \times 111yds. = 20868d.$ which $\div 20 = £86 19s.$ Ans.
- (5) Thus $5\frac{1}{2}cot. = \frac{11}{2}$ and $£31\frac{1}{4} = \frac{125}{4}$.
Then we have $\frac{11}{2} : \frac{125}{4} :: \frac{125}{4} : £2 6s. 3\frac{1}{4}d.$
For $\frac{125}{4} \times \frac{1}{2} = \frac{125}{8}$ thus $\frac{125}{8} \div \frac{11}{2} = 28\frac{1}{8}£ = £2 6s. 3\frac{1}{4}d.$ Ans.

DECIMAL FRACTIONS.

$$\begin{array}{r} (4) \quad .28043 \\ \quad .0005 \\ \hline \end{array}$$

$$\text{Ans. } .000140215$$

SUBTRACTION OF DECIMALS.

EXAMPLES.

$$\begin{array}{r} (5) \quad 13.16421 \\ \quad 4.286 \\ \hline \end{array} \qquad \begin{array}{r} (6) \quad 5960. \\ \quad .3742 \\ \hline \end{array}$$

$$\text{Ans. } 8.87821$$

$$\text{Ans. } 5959.6258$$

DIVISION OF DECIMALS.

EXAMPLES.

$$(2) \quad 4.21 \overline{)148.63(35.304+} \quad \text{Ans.}$$

1263

2233

2105

1280

1263

1700

1684

16 rem.

$$(4) \quad 931 \overline{)2.00385(.0021523+} \quad \text{Ans.}$$

1862

1418

931

4875

4655

$$(3) \quad 3.2 \overline{)2142.066+} \quad \text{Ans.}$$

192

222

192

30 rem.

2200

1862

3380

2793

587 rem.

REDUCTION OF DECIMALS.

CASE 1.

$$(2) \quad \begin{array}{r} 8 \overline{) 7.000} \\ \underline{.875} \text{ Ans.} \end{array} \quad (3) \quad \begin{array}{r} 24 \overline{) 170.70833+} \\ \underline{168} \end{array}$$

$$\begin{array}{r} 200 \\ \underline{192} \end{array}$$

$$\begin{array}{r} 80 \\ \underline{72} \end{array}$$

$$\begin{array}{r} 80 \\ \underline{72} \end{array}$$

$$\begin{array}{r} 8 \text{ rem.} \\ \underline{\quad} \end{array}$$

$$(4) \quad \begin{array}{r} 2162 \overline{) 3810.1762+} \text{ Ans.} \\ \underline{2162} \end{array} \quad (5) \quad \begin{array}{r} 254 \overline{) 1160.4566+} \text{ Ans.} \\ \underline{1016} \end{array}$$

$$\begin{array}{r} 16480 \\ \underline{15134} \end{array}$$

$$\begin{array}{r} 13460 \\ \underline{12972} \end{array}$$

$$\begin{array}{r} 4880 \\ \underline{4324} \end{array}$$

$$\begin{array}{r} 556 \text{ rem.} \\ \underline{\quad} \end{array}$$

$$\begin{array}{r} 1440 \\ \underline{1270} \end{array}$$

$$\begin{array}{r} 1700 \\ \underline{1524} \end{array}$$

$$\begin{array}{r} 1760 \\ \underline{1524} \end{array}$$

$$\begin{array}{r} 236 \text{ rem.} \\ \underline{\quad} \end{array}$$

CASE 2

- (2) Thus $2R. 4P.=84P.$ $1A.=160P.$
 Then $160)840(.525$ Ans.

$$\begin{array}{r}
 800 \\
 \hline
 400 \\
 320 \\
 \hline
 800 \\
 800 \\
 \hline
 \end{array}$$

- (3) $2qr. 2na.=10na.$ And $1yd.=16na.$
 Then $16)100(.625$ Ans.

$$\begin{array}{r}
 96 \\
 \hline
 40 \\
 32 \\
 \hline
 80 \\
 80 \\
 \hline
 \end{array}$$

- (4) $1hr.=60min.$ And $60)5.00(.08333+ Ans.$

480

- (5) $1oz.=480grs.$

Then $480)1000(.02083+ Ans.$

960

$$\begin{array}{r}
 4000 \\
 3840 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 1600 \\
 1440 \\
 \hline
 \end{array}$$

160 rem.

$$\begin{array}{r}
 200 \\
 180 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 200 \\
 180 \\
 \hline
 \end{array}$$

20 rem.

- (6) $2\text{ qts. } 1\text{ pt.} = 5\text{ pts.}$
 $1\text{ hhd.} = 504\text{ pts.}$ Then $504 \overline{) 5000(.00992 +}$ Ans.

4536

4640

4536

1040

1008

32 rem.

CASE 3.

- | | | |
|-----------------------|--------------|----------------|
| \pounds | <i>Day.</i> | <i>Gal.</i> |
| (2) .1361 | (3) .235 | (4) .42 |
| 20 | 24 | 4 |
| <hr/> | <hr/> | <hr/> |
| s. 2.7220 | 940 | qt. 1.68 |
| 12 | 470 | 2 |
| <hr/> | <hr/> | <hr/> |
| d. 8.6640 | hrs. 5.640 | pt. 1.36 |
| 4 | 60 | Ans. 1 1.36 |
| <hr/> | <hr/> | <hr/> |
| Ans. 2 $8\frac{1}{2}$ | min. 38.400 | |
| qr. 2.6580 | 60 | |
| <hr/> | <hr/> | |
| | sec. 24.000 | hrs. min. sec. |
| | Ans. 5 38 24 | |

- | | | |
|------------|------------|-------------------|
| <i>s.</i> | <i>Yd.</i> | <i>Acre.</i> |
| (5) .253 | (6) .436 | (7) .9 |
| 12 | 4 | 4 |
| <hr/> | <hr/> | <hr/> |
| d. 3.036 | qr. 1.744 | r. 3.6 |
| Ans. 3.036 | 4 | 40 |
| <hr/> | <hr/> | <hr/> |
| | qr. na. | R. P. |
| na. 2.976 | Ans. 1 2 | p. 24.0 Ans. 3 24 |
| <hr/> | <hr/> | <hr/> |

(3) Suppose C.'s 40

+8

48=B.'s

+16

64=A.'s

48=B.'s

40=C.'s

152 result.

$$\text{Then } 152 \text{ yrs. : } \left\{ \begin{array}{l} \overset{\text{yrs.}}{64} :: \overset{\text{yrs.}}{133} : \overset{\text{yrs.}}{56} = \text{A.'s} \\ 48 :: 133 : 42 = \text{B.'s} \\ 40 :: 133 : 35 = \text{C.'s} \end{array} \right\} \text{Ans.}$$

133 proof.

(4) Suppose No. 3 cost

\$

20

3

60=No. 2.

2

120=No. 1.

60

20

Result 200

$$\text{Then } 200 : \left\{ \begin{array}{l} \overset{\$}{120} :: \overset{\$}{350} : \overset{\$}{210} = \text{No. 1.} \\ 60 :: 350 : 105 = \text{No. 2.} \\ 20 :: 350 : 35 = \text{No. 3.} \end{array} \right\} \text{Ans.}$$

$$\begin{array}{r}
 \text{Yrs.} \\
 (5) \quad \text{Suppose } 60 \\
 \quad \quad 2 \\
 \hline
 \quad \quad 120 \\
 \quad \quad 3 \\
 \hline
 \quad 5)360 \\
 \hline
 \quad \quad 3)72 \\
 \hline
 \quad \quad \quad 24 \text{ result.} \\
 \hline
 \end{array}$$

Then 24yrs. : 60yrs. :: 14yrs. : 35yrs. Ans. .

$$\begin{array}{r}
 \text{(6) } \quad \text{Thus suppose } \begin{array}{l} \pounds \\ 40 \\ 5\frac{1}{2} \end{array} \\
 \hline
 \quad \quad 200 \\
 \quad \quad 20 \\
 \quad \quad 10 \\
 \hline
 \text{Int. for 1yr. } \left\{ \begin{array}{l} \pounds 2|30 \\ 20 \\ \hline s. 6|00 \end{array} \right. \\
 \hline
 \quad \quad \begin{array}{l} \pounds \quad s. \\ \text{And } \frac{1}{2} | 2 \quad 6 \\ \hline \quad \quad 4 \text{ years.} \end{array}
 \end{array}$$

$$\begin{array}{r}
 \text{Int. in 4 yrs. } 9 \quad 4 \\
 \text{Int. for 8 mo. } \left\{ \begin{array}{l} \frac{1}{2} | 1 \quad 3 \\ \hline 0 \quad 7 \quad 8 \end{array} \right.
 \end{array}$$

$$\text{Whole int. } 10 \quad 14 \quad 8$$

Then as £10 14s. 8d. : £201 5s. :: £40 : £750. Ans.

- (7) Thus, suppose the cistern to hold 100 gallons.
 Then $100 \div 45 \text{ min.} = 2\frac{2}{5} \text{ gal.}$ = the quantity which the first cock discharges in a minute.
 And $100 \div 55 \text{ min.} = 1\frac{9}{11} \text{ gal.}$ the quantity which the second cock discharges in 1 min.
 Then $100 \div 30 \text{ min.} = 3\frac{1}{3} \text{ gal.}$ = the quantity which the discharging cock discharges in 1 min. Consequently, $2\frac{2}{5} \text{ gal.} + 1\frac{9}{11} \text{ gal.} = 4\frac{4}{55} \text{ gal.}$ the quantity which the cistern receives by both the first and second cocks in a minute. Then as $3\frac{1}{3} \text{ gals.}$ run out in the same time, $4\frac{4}{55} \text{ gal.} - 3\frac{1}{3} \text{ gal.} = \frac{7}{55} \text{ gal.}$ that the cistern gains in 1 min.
 Then $\frac{7}{55} \text{ gal.} : 100 \text{ gal.} :: 1 \text{ min.} : 2 \text{ hrs. } 21 \text{ min. } 25\frac{1}{2} \text{ sec.}$
 Ans.

DOUBLE POSITION.

- (2) First suppose they received $\overset{8}{276}$
 $\underline{2}$
 $\underline{\hspace{1.5cm}}$
 3)552
 184 = what A. spent.
 + 250
 $\underline{\hspace{1.5cm}}$
 434 = what B. spent.
 $\underline{-276}$
 $\underline{\hspace{1.5cm}}$
 158 B. was in debt every
 7 year.
 $\underline{\hspace{1.5cm}}$
 1106 = 7 years' debt.
 $\underline{-350}$
 $\underline{\hspace{1.5cm}}$
 756 error too much.
 $\underline{\hspace{1.5cm}}$

Again suppose the salary was $\$300$

2

3)600

200 = A. spent.

+ 250

450 B. spent.

- 300

B. was every year 150 in debt.

7

And in 7 years he was 1050 in debt.

- 350

700 error too much.

Then $756 \times 300 = 226800$

$700 \times 276 = 193200$

Difference of errors 56)33600(\$600 the salary,

336 of which = 400

A. spends, then

00 $400 + 250 = 650$

B. spends. Ans.

(3) First suppose 30 working days.

1

\$30

- 10 that he forfeits.

Receives 20

27 50

7 50 error too little.

Again suppose 20 working days.

$$\begin{array}{r}
 1 \\
 \hline
 \$20 \\
 \text{Forfeits } 15 \\
 \hline
 \text{Receives } 5 \\
 27 \ 50 \\
 \hline
 22 \ 50 \text{ error too little.}
 \end{array}$$

$$\begin{array}{r}
 \text{Then } 2250 \times 30 = 67500 \\
 750 \times 20 = 15000
 \end{array}$$

$$\begin{array}{r}
 \text{Difference of errors } 1500 \ 52500 \ (35 \text{ working days.}) \\
 4500 \\
 \hline
 7500 \\
 \hline
 7500
 \end{array}$$

Therefore $50 - 35 = 15$ idle days. Ans.

$$\begin{array}{r}
 \$ \\
 (4) \text{ First suppose } 10 \text{ cows} = 160 \\
 \text{And } 10 \text{ oxen} = 240 \\
 40 \text{ calves} = 240 \\
 \hline
 \text{The whole } 640 \\
 - 320 \\
 \hline
 320 \text{ error too much.}
 \end{array}$$

$$\begin{array}{r}
 \$ \\
 \text{Again suppose } 8 \text{ cows} = 128 \\
 \text{And } 8 \text{ oxen} = 192 \\
 \text{And } 32 \text{ calves} = 192 \\
 \hline
 \text{The whole } 512 \\
 320 \\
 \hline
 192 \text{ error too much.}
 \end{array}$$

$$\text{Then } 320 \times 8 = 2560$$

$$192 \times 10 = 1920$$

Difference of errors 128)640(5 *cows 5 oxen & 20 calves.*
 640
 ———
 Ans.

(5) First suppose

Ft.

$$\text{No. 2} = 20$$

$$10 = \frac{1}{2}$$

$$15$$

$$25 = \text{No. 3.}$$

$$+ 15$$

$$40$$

$$- 20$$

20 error too little.

Again suppose

Ft.

$$\text{No. 2} = 30$$

$$15 = \frac{1}{2}$$

$$15$$

$$30 = \text{No. 3.}$$

$$+ 15$$

$$45$$

$$45 = \text{No. 2.}$$

$$- 30$$

15 error too little.

$$\text{Then } 20 \times 30 = 600$$

$$15 \times 20 = 300$$

Difference of errors 5)300

$$60 = \text{No. 2, then } 60 - 15 = 45 = \text{No. 3.}$$

And then we have No. 1 = 15, No. 2 = 60, and No. 3 = 45, which added together = 120 *ft.* the length of the pole. Ans.

(6) Thus first suppose the whole property to have been worth £

396

Again suppose £ 432

$$\begin{array}{r} 198 = \frac{1}{2} \\ -40 \\ \hline \end{array}$$

158 = A.'s share.

$$\begin{array}{r} 132 = \frac{1}{3} \\ +12 \\ \hline \end{array}$$

144 = B.'s share.

$$\begin{array}{r} -80 \\ \hline \end{array}$$

64 = C.'s share.

$$\begin{array}{r} 144 \\ 158 \\ \hline \end{array}$$

366 sum.

$$\begin{array}{r} 396 \\ \hline \end{array}$$

30 error of defect.

$$\begin{array}{r} 216 = \frac{1}{2} \\ -40 \\ \hline \end{array}$$

176 = A.'s

$$\begin{array}{r} 144 = \frac{1}{3} \\ +12 \\ \hline \end{array}$$

156 = B.'s

$$\begin{array}{r} -80 \\ \hline \end{array}$$

76 = C.'s

$$\begin{array}{r} 156 \\ 176 \\ \hline \end{array}$$

408 sum.

$$\begin{array}{r} 432 \\ \hline \end{array}$$

24 error of defect.

$$\text{Then } 432 \times 30 = 12960$$

$$396 \times 24 = 9504$$

Difference of errors 6)3456

£576 Ans.

£

$$\text{Then } 576 \div 2 - 40 = 248 \text{ A.'s share.}$$

$$204 \div 3 + 12 = 204 \text{ B.'s do.}$$

$$204 - 80 = 124 \text{ C.'s do.}$$

£576 proof.

(7) First suppose each boy received $\begin{array}{r} \text{£} \\ 3 \\ 2 \\ \hline \end{array}$

$6 = \text{share of each woman.}$

$18 = \text{share of each man.}$

And $19 \times 3 = 57$
 $11 \times 6 = 66$
 $7 \times 18 = 126$

$\begin{array}{r} 249 \\ 172 \ 19 \ 4\frac{1}{4} \\ \hline 76 \ 0 \ 7\frac{3}{4} \text{ error of excess.} \end{array}$

Again suppose each boy received $\begin{array}{r} \text{£} \\ 1 \\ 2 \\ \hline \end{array}$

$2 \text{ share of each woman.}$

$6 \text{ share of each man.}$

And $19 \times 1 = 19$
 $11 \times 2 = 22$
 $7 \times 6 = 42$

$\begin{array}{r} 83 \\ 172 \ 19 \ 4\frac{1}{4} \\ \hline 89 \ 19 \ 4\frac{1}{4} \text{ error of defect.} \end{array}$

	£	s.	d.		£	s.	d.
Now	89	19	4½	× 3 =	269	18	0½
	76	0	7½	× 1 =	76	0	7½
					345	18	8½

Which ÷ 166 sum of errors = £2 1s. 8d. + = each boy's share, which × 2 = £4 3s. 4½d. + = each woman's share, which × 3 = £12 10s. 0¾d. + = each man's share. Ans.

INVOLUTION, OR THE RAISING OF POWERS.

EXAMPLES.

- (2) $14 \times 14 \times 14 = 2744$. Ans.
 (3) $2.8 \times 2.8 \times 2.8 \times 2.8 \times 2.8 \times 2.8 = 481.890304$. Ans.
 (4) $.263 \times .263 \times .263 = .018191447$. Ans.
 (5) $\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{1}{256}$. Ans.
 (6) $401 \times 401 \times 401 \times 401 = 25856961601$. Ans.

EVOLUTION, OR THE EXTRACTING OF ROOTS.

SQUARE ROOT.

EXAMPLES.

- | | |
|---|---|
| <p>(2) 39375655(6275 Ans.
 36
 <hr style="width: 100px; margin-left: 0;"/> 122)337
 244
 <hr style="width: 100px; margin-left: 0;"/> 1247)9356
 8729
 <hr style="width: 100px; margin-left: 0;"/> 12545)62755
 62725
 <hr style="width: 100px; margin-left: 0;"/> Rem. 30</p> | <p>(3) 1486.179010(38.55. Ans.
 9
 <hr style="width: 100px; margin-left: 0;"/> 68)586
 544
 <hr style="width: 100px; margin-left: 0;"/> 765)4217
 3825
 <hr style="width: 100px; margin-left: 0;"/> 7705)39290
 38525
 <hr style="width: 100px; margin-left: 0;"/> Rem. 76510</p> |
|---|---|

$$(4) \sqrt{98385163} = 9917 \text{ Ans.} \quad (5) \sqrt{.0001324960} = .01151 \text{ Ans.}$$

$$\begin{array}{r} 188 \overline{)1538} \\ \underline{1504} \end{array}$$

$$\begin{array}{r} 1961 \overline{)3451} \\ \underline{1961} \end{array}$$

$$\begin{array}{r} 19627 \overline{)149063} \\ \underline{137389} \end{array}$$

$$\text{Rem. } 11674$$

$$\begin{array}{r} 21 \overline{)32} \\ \underline{21} \end{array}$$

$$\begin{array}{r} 225 \overline{)1149} \\ \underline{1125} \end{array}$$

$$\begin{array}{r} 2301 \overline{)2460} \\ \underline{2301} \end{array}$$

$$\text{Rem. } 159$$

$$(6) \sqrt{18.362147} = 4.285 \text{ Ans.}$$

$$\begin{array}{r} 82 \overline{)236} \\ \underline{164} \end{array}$$

$$\begin{array}{r} 848 \overline{)7221} \\ \underline{6784} \end{array}$$

$$\begin{array}{r} 8565 \overline{)43747} \\ \underline{42825} \end{array}$$

$$\text{Rem. } 922$$

$$(7) \sqrt{\frac{445}{3175}} = \frac{4}{17} \text{ whose square root is } \frac{2}{\sqrt{17}} \text{ Ans.}$$

$$(8) \sqrt{\frac{36}{1784}} = \frac{3}{\sqrt{1784}} \text{ whose square root is } \frac{3}{\sqrt{1784}} \text{ Ans.}$$

SQUARE ROOT.

143

(9) $500\overline{)3200}(\sqrt{64}.8 \text{ Ans.}$
 $\begin{array}{r} 3000 \quad 64 \\ \hline 2000 \\ 2000 \\ \hline \end{array}$

(10) $50 \times 64 + 49 = 3249.$

Then $\begin{array}{r} 3249 \\ 25 \end{array}(\sqrt{} = 7\frac{1}{2} \text{ Ans.}$

$\begin{array}{r} 107\overline{)749} \\ 749 \\ \hline \end{array}$

And $\sqrt{64}.8$ denominator.
 $\begin{array}{r} 64 \\ \hline \end{array}$

(11) $30 \times 100 + 25 = 30.25$

Then $\begin{array}{r} 30.25 \\ 25 \end{array}(5.5 = 5\frac{1}{2} \text{ Ans.}$

$\begin{array}{r} 105\overline{)525} \\ 525 \\ \hline \end{array}$

(12) $\begin{array}{r} 1296 \\ 3 \times 3 = 9 \end{array}(36 \text{ Ans.}$

$\begin{array}{r} 66\overline{)396} \\ 396 \\ \hline \end{array}$

(13) $\begin{array}{r} 169 \\ 1. \end{array}(13 \text{ Ans.}$

$\begin{array}{r} 23\overline{)69} \\ 69 \\ \hline \end{array}$

(14) $\begin{array}{r} 3097800 \\ 1 \end{array}(1760 \text{ yds.} = 1 \text{ mile.}$
 Ans.

$\begin{array}{r} 27\overline{)209} \\ 189 \\ \hline \end{array}$

$\begin{array}{r} 346\overline{)2076} \\ 2076 \\ \hline \end{array}$

$\begin{array}{r} 00 \\ \hline \end{array}$

(15)

Thus $15 \times 15 = 225$

$24 \times 24 = 576$

$\sqrt{801} (28.3 \text{ ft. Ans.})$

4

48)401

384

563)1700

1689

Rem. 11

(16) $212 \times 212 = 44944 \text{ ft.}$

And $20 \text{ yds.} = 60 \times 60 = 3600 \text{ ft.}$

$41344 (203.332 \text{ ft. Ans.})$

$2 \times 2 = 4$

403)1344

1209

4063)13500

12189

40663)131100

121989

406662)911100

813324

Rem. 97776

CUBE ROOT.

EXAMPLES.

$$(2) \quad \begin{array}{r} 7532641(196.02 \text{ Ans.} \\ 1 \end{array}$$

$$\left. \begin{array}{l} \text{Defec. div. and squ. of } 9=381 \quad 6532 \\ +270=\text{com. divisor} \quad =651 \quad 5859 \end{array} \right\}$$

$$\left. \begin{array}{l} \text{Def. div. and squ. of } 6=108336 \quad 673641 \\ +3420=\text{com. div.} \quad =111756 \quad 670536 \end{array} \right\}$$

$$\text{Defective divisor } 115248 \quad 3105000$$

$$\left. \begin{array}{l} \text{Def. di. \& sq. of } .02=1152480004 \quad 3105000000 \\ +11760=\text{com. div.}=1152491764 \quad 2304983528 \end{array} \right\}$$

$$\text{Rem. } 800016472$$

$$(3) \quad \begin{array}{r} 12.113847500(2.296 \text{ Ans.} \\ 2 \times 2 \times 2=8 \end{array}$$

$$\left. \begin{array}{l} \text{Def. div. and squ. of } 2=1204 \quad 4113 \\ +120=\text{com. divisor} \quad =1324 \quad 2648 \end{array} \right\}$$

$$\left. \begin{array}{l} \text{Def. div. \& sq. of } 9=145281 \quad 1465847 \\ +5940=\text{com. di.} \quad =151221 \quad 1360989 \end{array} \right\}$$

$$\left. \begin{array}{l} \text{Def. di. \& sq. of } 6=15732336 \quad 104858500 \\ +61830=\text{co. di.}=15773556 \quad 94641336 \end{array} \right\}$$

$$\text{Rem. } 10217164$$

(4)

5382674(175.2 Ans.
1
$$\left\{ \begin{array}{l} \text{Defec. div. and square of 7} = 349)4382 \\ + 210 = \text{complete divisor} = 559)8913 \end{array} \right.$$

$$\left\{ \begin{array}{l} \text{Defec. div. \& square of 5} = 86725)469674 \\ + 2550 = \text{complete divisor} = 89275)446375 \end{array} \right.$$

$$\left\{ \begin{array}{l} \text{Defec. div. and sq. of 2} = 9187504)23299000 \\ + 10500 = \text{com. divisor} = 9198004)18396008 \end{array} \right.$$

Rem. 4902992

(5)

378621350(.723. Ana.
 $7 \times 7 \times 7 = 343$

$$\left\{ \begin{array}{l} \text{Defec. div. \& sq. of 2} = 14704)35621 \\ + 420 = \text{com. divisor} = 15124)30248 \end{array} \right.$$

$$\left\{ \begin{array}{l} \text{Def. div. \& sq. of 3} = 1555209)5373350 \\ + 6480 = \text{com. divi.} = 1561689)4685067 \end{array} \right.$$

Rem. 688283

(6)

46.295363543(3.590 Ana.
 $3 \times 3 \times 3 = 27$

$$\left\{ \begin{array}{l} \text{Def. div. \& sq. of 5} = 2725)19295 \\ + 450 = \text{com. divi.} = 3175)15875 \end{array} \right.$$

$$\left\{ \begin{array}{l} \text{Def. div. \& sq. of 9} = 367581)3420363 \\ + 9450 = \text{com. di.} = 377031)3393279 \end{array} \right.$$

Defective divisor 386643)27064543

ALLIGATION.

147

(7) Thus $4\frac{200}{1036} = \frac{52}{259}$, which reduced to a decimal=
2007722

Then .200772200(.585 Ans.
125

{ Defec. divisor & squ. of 8=7564)75772
 { +200=complete divisor=8764)70112

{ Defec. div. and sq. of 5=1009225)5660200
 { +8700=comp. divisor=1017925)5089625

570575 Rem.

(8) Thus $\frac{3}{36\frac{2}{3}} = \frac{3}{36.66666} + (3.32$ Ans.
 $3 \times 3 \times 3 = 27$

{ Defec. div. & squ. of 3=2709)9866
 { +270=complete divi. =2979)8937

{ Defec. div. & squ of 2=326704)929666
 { +198=com. divisor =328684)657368

Rem. 272298



ALLIGATION.

CASE 1.

	cwt.	\$	cts.	\$	cts.
(2)	2 at 25	=	50	00	
	4	20	50	=	82 00
	7	18	62½	=	130 37½
					<u>262 37½</u>
	13				<u>262 37½</u>

Then as 13cwt. : 1cwt. :: \$262 37½cts. : \$20 18½cts. Ans.

CASE 2.

$$\begin{array}{rcl}
 \text{(2)} & & \text{cts.} \\
 \text{Mean rate 50} & \left\{ \begin{array}{l} 34 \\ 42 \\ 86 \\ 110 \end{array} \right. & \begin{array}{l} = 36 \text{ at } 34 \text{ cts.} \\ = 60 \text{ at } 42 \text{ cts.} \\ = 16 \text{ at } 86 \text{ cts.} \\ = 8 \text{ at } 110 \text{ cts.} \end{array} \end{array} \quad \left. \vphantom{\begin{array}{l} \text{Mean rate 50} \\ \left\{ \begin{array}{l} 34 \\ 42 \\ 86 \\ 110 \end{array} \right\} } \right\} \text{Ans.}$$

CASE 3.

$$\begin{array}{rcl}
 \text{(2)} & & \text{cts.} \\
 \text{Mean rate 92} & \left\{ \begin{array}{l} 75 \\ 86 \\ 94 \\ 105 \end{array} \right. & \begin{array}{l} = 2 \\ = 13 \\ = 17 \\ = 6 \end{array}
 \end{array}$$

lbs.

$$\begin{array}{l}
 \text{Then } 2 : 6 :: 13 : 39 \text{ at } 86 \text{ cts.} \\
 2 : 6 :: 17 : 51 \text{ at } 94 \text{ cts.} \\
 2 : 6 :: 6 : 18 \text{ at } 105 \text{ cts.} \end{array} \quad \left. \vphantom{\begin{array}{l} 2 : 6 :: 13 : 39 \\ 2 : 6 :: 17 : 51 \\ 2 : 6 :: 6 : 18 \end{array}} \right\} \text{Ans.}$$

CASE 4.

$$\begin{array}{rcl}
 \text{(2)} & & \text{cts.} \\
 \text{Mean rate 145} & \left\{ \begin{array}{l} 130 \\ 160 \\ 180 \end{array} \right. & \begin{array}{l} = 15 + 35 = 50 \\ = 15 \\ = 15 \end{array}
 \end{array}$$

80 sum of differ.

$$\begin{array}{l}
 \text{Then as } 80 : 50 :: 32 : 20 \text{ at } 130 \text{ cts.} \\
 80 : 15 :: 32 : 6 \text{ at } 160 \text{ cts.} \\
 80 : 15 :: 32 : 6 \text{ at } 180 \text{ cts.} \end{array} \quad \left. \vphantom{\begin{array}{l} 80 : 50 :: 32 : 20 \\ 80 : 15 :: 32 : 6 \\ 80 : 15 :: 32 : 6 \end{array}} \right\} \text{Ans.}$$

ARITHMETICAL PROGRESSION.

CASE 1.

EXAMPLES.

(2) Thus $40-1=39$

2 com. dif.

$$\begin{array}{r} \hline 78 \\ 2=1\text{st term.} \\ \hline \end{array}$$

$$\begin{array}{r} \hline 80 \\ 2=1\text{st term.} \\ \hline \end{array}$$

$$\begin{array}{r} \hline 82 \text{ sum.} \\ 40 \\ \hline \end{array}$$

$$\begin{array}{r} \hline 2)3280 \\ \hline \$16.40 \text{ Ans.} \\ \hline \end{array}$$

(3) $10-1=9$

4 com. dif.

$$\begin{array}{r} \hline 36 \\ +10=1\text{st term.} \\ \hline \end{array}$$

$$\begin{array}{r} \hline 1\text{st Ans. } 46 \text{ last term.} \\ +10 \\ \hline \end{array}$$

$$\begin{array}{r} \hline 56 \\ 10 \\ \hline \end{array}$$

$$\begin{array}{r} \hline 2)560 \\ \hline 280 \text{ 2d Ans.} \\ \hline \end{array}$$

(4)

 $75-1=74$

2 common difference.

$$\begin{array}{r} \hline 148 \\ +6=1\text{st term.} \\ \hline \end{array}$$

$$\begin{array}{r} \hline \$1.54 \text{ for the last. } 1\text{st Ans.} \\ 6=1\text{st term.} \\ \hline \end{array}$$

$$\begin{array}{r} \hline 160 \text{ sum.} \\ 75 \\ \hline \end{array}$$

$$\begin{array}{r} \hline 800 \\ 1120 \\ \hline \end{array}$$

$$\begin{array}{r} \hline 2)12000 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \$60 \text{ 00 in the whole. Ans.} \\ \hline \end{array}$$

CASE 2.

(2)

Thus 175

—21

8—1=7)154

—
\$22 common difference.And 175+21=196 sum of extremes.
8 number of terms.—
2)1568—
784 whole sum.

Lastly 21+22= 43=2d payment.

43+22= 65=3d

65+22= 87=4th

87+22=109=5th

109+22=131=6th

131+22=153=7th

153+22=175=8th

—
763—
21=1st payment.—
\$784 proof.

(3) Thus 49

—4

Then 49+4=53 sum of extremes.

—
10 number of terms.

10—1=9)45

—
2)530—
5 com. dif. Received \$2.65 Ans.

GEOMETRICAL PROGRESSION.

EXAMPLES.

(2) Thus power 1 2 3 4
 Ratio 3 9 27 81
 27 3d power.

567
 162

2187 = 7th power.
 5 = 1st term.

1st Ans. 10035 = last term.
 3 ratio.

32805
 — 5 = 1st term.

Ratio less 1 = 2) 32800

£16400 Ans. 2d.

(3) Thus power 1 2 3 4 5 6 7 8 9
 Ratio 2 4 8 16 32 64 128 256 512

512
1024
 512
 2560

262144 = 18th p.
 4 = 2d do.

1048576 = 20th p.
 1 1st term.

1048576 = last term.
 2 ratio.

2097152
 1 = 1st term.

Ratio less 1 = 1) 2097151

Ans. \$20971.51cts.

COMPOUND INTEREST BY • DECIMALS.

EXAMPLES.

(2) Thus, tabular number 1.2155062
750

607753100
85085434

911.6296500

Amount of £1 for 6mo. 1.024695 from table first.

45581482500
82046668500
54697779000
36465186000
18232593000
9116296500

£934.1423442067500
20

s.2.8468841350000
12

d.10.1626096200000

	£	s.	d.
Amount	934	2	10+
Principal	750	0	0

Interest 184 2 10+ Ans.

CASE 2.

- (1) Thus £695 13s. 9d. = 695.6875£.
Then from tab. II. $1.2762815 \times 695.6875 = 545£$ 1s. 9d. + Ans.
- (2) Thus £260 5s. 3d. = 260.2625£ which \div by 1.191016 from table II. = £218 10s. 5d. + Ans.



ANNUITIES AT COMPOUND INTEREST.

CASE 1.

- (2) The number from table III. = 5.637093
200 = annuity.

Amount for yearly payments = 1127.4186 which \times 1.014781 proper number for $\frac{1}{2}$ yearly payment from table V. = \$1144 08 2m. + Ans.

CASE 2.

- (2) Thus, the num. from tab. IV. = 4.21236
£70 annuity.

\$294 86 52 Ans. for yearly payments.

Then \$294.8652 \times 1.014781 from table V. = \$299.22.3 + mills. Ans. for $\frac{1}{2}$ yearly payments.

And 294.8652×1.022257 for quarterly payments from the same table = \$301.42.8 + mills. Ans. for quarterly payments.

ANNUITIES IN REVERSION.

- (2) Thus $9+4=13$ yrs. = 0.98565 table IV.
 4 do. = 3.62989—

$$\begin{array}{r} 6.35576 \\ 120 \end{array}$$

$$\begin{array}{r} 1271152 \\ 635576 \end{array}$$

$$\underline{\$762.69.1.2m. \text{ Ans.}}$$



PERPETUITIES AT COMPOUND INTEREST.

- (2) Thus, ratio—1 = 1.06—1 = .06)260.00

$$\underline{\underline{\$4333.33.3m. + \text{ Ans.}}}$$



COMBINATION.

EXAMPLES.

- (2) Thus $20 \times 19 \times 18 \times 17 \times 16 \times 15 \times 14 \times 13 \times 12 \times 11 =$
 $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 =$
 670442572800
 $\underline{\hspace{1cm}} = 184756 \text{ Ans.}$
 3628800

PERMUTATION.

EXAMPLES.

- (2) Thus $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 =$
 479001600 number of changes.
 15 seconds.

$$\begin{array}{r} 2395008000 \\ 479001600 \\ \hline \end{array}$$

$$6|0)718502400|0 \text{ sec.}$$

$$6|0)11975040|0 \text{ min.}$$

$$365\frac{1}{4}d. = 8766 \text{ hrs.}) 1995840 (227 \text{ yrs. } 248 \text{ days. } 6 \text{ hrs.}$$

Ans.



DUODECIMALS.

ADDITION OF DUODECIMALS.

EXAMPLES.

(1)
$$\begin{array}{r} \text{Ft. in. " ' ""} \\ 10 \text{ } 6 \text{ } 6 \text{ } 11 \text{ } 6 \\ 15 \text{ } 9 \text{ } 5 \text{ } 2 \text{ } 10 \\ 18 \text{ } 4 \text{ } 1 \text{ } 7 \text{ } 9 \\ 12 \text{ } 8 \text{ } 6 \text{ } 5 \text{ } 7 \\ \hline \end{array}$$

Ans.
$$\begin{array}{r} 57 \text{ } 3 \text{ } 8 \text{ } 3 \text{ } 8 \\ \hline \end{array}$$

(2)
$$\begin{array}{r} \text{Ft. in. " ' ""} \\ 37 \text{ } 8 \text{ } 10 \text{ } 6 \text{ } 9 \\ 43 \text{ } 11 \text{ } 2 \text{ } 4 \text{ } 7 \\ 19 \text{ } 7 \text{ } 5 \text{ } 3 \text{ } 8 \\ 18 \text{ } 4 \text{ } 1 \text{ } 7 \text{ } 2 \\ \hline \end{array}$$

Ans.
$$\begin{array}{r} 119 \text{ } 7 \text{ } 7 \text{ } 10 \text{ } 2 \\ \hline \end{array}$$

DUODECIMALS.

$$\begin{array}{r}
 \text{(3)} \quad \text{Ft. in. " } \\
 16 \ 8 \ 0 \\
 14 \ 6 \ 0 \\
 17 \ 9 \ 2 \\
 \hline
 \text{Ans. } 48 \ 11 \ 2
 \end{array}$$

SUBTRACTION OF DUODECIMALS.

EXAMPLES.

$$\begin{array}{r}
 \text{(1)} \quad \text{Ft. in. " ' "" } \\
 \text{From } 38 \ 8 \ 4 \ 7 \ 5 \\
 \text{Take } 15 \ 11 \ 6 \ 9 \ 3 \\
 \hline
 \text{Ans. } 22 \ 8 \ 9 \ 10 \ 2
 \end{array}
 \quad
 \begin{array}{r}
 \text{(2)} \quad \text{Ft. in. " ' "" } \\
 \text{From } 720 \ 3 \ 8 \ 1 \ 6 \\
 \text{Take } 13 \ 9 \ 4 \ 7 \ 10 \\
 \hline
 \text{Ans. } 706 \ 6 \ 3 \ 5 \ 8
 \end{array}$$

$$\begin{array}{r}
 \text{(3)} \quad \text{Ft. in. " ' "" } \\
 \text{From } 475 \ 7 \ 2 \ 0 \ 0 \\
 \text{Take } 81 \ 2 \ 5 \ 10 \ 6 \\
 \hline
 \text{Ans. } 394 \ 4 \ 8 \ 1 \ 6
 \end{array}$$

MULTIPLICATION OF DUODECIMALS.

CASE I.

EXAMPLES.

$$\begin{array}{r}
 \text{(2)} \quad \text{Ft. in. } \\
 54 \ 10 \\
 5 \ 7 \\
 \hline
 31 \ 11 \ 10 \\
 274 \ 2 \\
 \hline
 \text{Ans. } 306 \ 1 \ 10
 \end{array}
 \quad
 \begin{array}{r}
 \text{(3)} \quad \text{Ft. in. " } \\
 6 \ 9 \ 3 \\
 3 \ 5 \\
 \hline
 2 \ 9 \ 10 \ 3 \\
 20 \ 3 \ 9 \\
 \hline
 \text{Ans. } 23 \ 1 \ 7 \ 3
 \end{array}$$

CASE 2.

(2)

6	1	1	81	10	4	
						$7 \times 2 = 14$
			573	0	4	
					2	
			1146	0	8	
1	1	1	40	11	2	
4	1	1	6	9	10	4
1	1	1	2	3	3	5
			6	9	10	4
ft 1196						7 9 7 8 Ans.

(3)

<i>in.</i>	<i>Ft. in. " "</i>	
4	1	2 5 7 2
1	1	0 9 10 4 8
3	1	2 5 7 2
6	1	7 4 9 6
4	1	1 2 9 7
1	1	9 10 4 8
		2 5 7 2
1 1 0 8 5 4 11		10 contents of 1 sh.
		$10 \times 10 \times 10 = 1000$
10 10 7 0 6 1 10		4
		10
108 9 10 5 1 6 7		4
		10
sq. ft. 1088 2 8 3 3 6 1		4 Ans.

PROMISCUOUS EXAMPLES.

(1)

Thus A.'s 25 years.

+15

B.'s 40 years.

+12

C.'s 52 years. Ans.

(2)

Thus $\begin{array}{r} \$ \text{ cts.} \\ 220 \end{array} 50 \div 5 = 44 \begin{array}{r} \$ \text{ cts.} \\ 10 \end{array}$ A.'s own share.
 $220 \ 50 \div 6 = 36 \ 75$ B.'s do.

80 85 sum.

220 50

139 65 = C.'s own share.

Then $\begin{array}{r} \$ \text{ cts.} \\ 36 \end{array} 75 \div 2 = 18 \begin{array}{r} \$ \text{ cts. m.} \\ 37 \end{array} 5 = \frac{1}{2}$ B.'s share.
 44 10

62 47 5 = A.'s last share.

And $\begin{array}{r} \$ \text{ cts. m.} \\ 18 \end{array} 37 \ 5$
 139 65

Ans. 158 02 5 = C.'s last share.

- (3) $\$100 - 7\frac{1}{2} : \$100 :: \$56 \text{ 25cts.} : \$60 \text{ 81cts.} +$
 For $5625 \times 100 = 562500$ the dividend.
 And $100 - 7\frac{1}{2} = 92\frac{1}{2}$ the divisor.
 Then $562500 \div 92\frac{1}{2} = \$60 \text{ 81cts.} + \text{Ans.}$

- (4) Thus B. gains 2 miles per hour.
 Then as $2m. : 50m. :: 1hr. : 25hrs.$ 1st Ans.
 Now as B. went at the rate of 10 miles per hour for
 25 hours, $10 \times 25 = 250$ miles, the 2d Ans.

- (5) Thus $\frac{4}{10} = \frac{1}{2} \} 750$

187 50 whole price of the damaged.
 100 loss.

87 50 what it sold for.

Then $\$1 \text{ 25cts.} : \$87 \text{ 50cts.} :: 1yd. : 70yds. = \text{quantity damaged.}$

And $70 \times 4 = 280yds.$ the whole quantity.

70
 210 undamaged.

And $\$750 \text{ 00cts.}$ cost.

87 '50 received for the damaged.

210yds. : \$62 50 :: 1 : \$3 15\frac{1}{2}cts. + Ans.

160

PROMISCUOUS EXAMPLES.

- (6) To get first brick, 4 ft. first term.
Last brick, 400 ft. last term.

404 sum of extremes.
100 number of terms.

2)40400

Feet in a mile, 5280)20200(3 m. 4360 ft.
15840

4360

- (7) Thus admit the wall to contain 3600 feet.

Then 20)3600(180 feet raised in a day by A. B. & C.

24)3600(150

B. C. & D.

30)3600(120

C. D. & A.

36)3600(100

A. B. & D.

3)550

183 $\frac{1}{2}$ feet per day by altogether.

Then 183 $\frac{1}{2}$

B. C. & D. 150

A. 33 $\frac{1}{2}$

And 183 $\frac{1}{2}$

C. D. & A. 120

B. 63 $\frac{1}{2}$

PROMISCUOUS EXAMPLES.

161

$$\begin{array}{r} \text{And } 183\frac{1}{2} \\ \text{A. B. \& D. } 100 \\ \hline \text{C. } 83\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} \text{And } 183\frac{1}{2} \\ \text{A. B. \& C. } 180 \\ \hline \text{D. } 3\frac{1}{2} \\ \hline \end{array}$$

Then, feet per day by A. $33\frac{1}{2}$ $\frac{\text{days.}}{3600(108 \text{ for A. to do it in.})}$
 do. by B. $63\frac{1}{2}$ $\frac{3600(56\frac{1}{2})}{\text{B. do.}}$
 do. by C. $83\frac{1}{2}$ $\frac{3600(43\frac{1}{2})}{\text{C. do.}}$
 do. by D. $3\frac{1}{2}$ $\frac{3600(1080)}{\text{D. do.}}$
 And $183\frac{1}{2}$ $\frac{3600(19\frac{7}{11} \text{ days all working together. Ans.})}{\text{Ans.}}$

$$\begin{array}{r} \text{(8) Thus 4 crowns at } 146 \text{ each} = 584 \\ \quad 3 \text{ dolla. } 108 = 324 \\ \quad 2 \text{ ducats } 136 = 272 \\ \hline 1180d. \text{ sum.} \\ \hline \end{array}$$

$$\text{And } £1055 \text{ } 15s. = 253380d.$$

$$\begin{array}{l} \text{Then} \\ 1180 : 253380 :: \left\{ \begin{array}{l} 584 : 125402 \div 146 = 858\frac{2}{3} \text{ cr.} \\ 324 : 69572 \div 108 = 644\frac{2}{3} \text{ s.} \\ 272 : 58406 \div 136 = 429\frac{1}{4} \text{ duc.} \end{array} \right\} \text{Ans.} \end{array}$$

$$\begin{array}{l} \text{(9) Thus } 9m. : 21m. :: \$332 \text{ } 50\text{cts.} : \$775 \text{ } 83\frac{1}{2}\text{cts.} \text{ Ans.} \\ \text{For } 33250 \times 21 = 698250 \text{ the dividend.} \\ \text{And } 9 = \text{the divisor.} \\ \text{Then } 698250 \div 9 = \$775 \text{ } 83\frac{1}{2}\text{cts.} \end{array}$$

(10)

Thus 12

4

 $16\text{yrs.} = 10.83777$ Table IV.

Time of reversion 12 = 8.86325 do.

1.97452 difference.

720.25 annuity.

987260

394904

394904

1382164

 $\$1422.1480200$ Or $\$1422$ 14cts. 8m. + Ans.

- (11) $3150 \text{ gigs} \div 7 \times 5 =$ } \$ cts.
 2250 wagons wh. } 135 00 for the wagons.
 $\times 6\text{cts.} =$
 $3150 \text{ gigs} \div 3 \times 5 =$ }
 5250 footmen wh. } 52 50 for footmen.
 $\times 1\text{ct.} =$
 $5250 \text{ footmen} \div 6 \times 4$ }
 = 3500 horsemen } 70 00 for horsemen.
 which $\times 2\text{cts.} =$
 $3150 \text{ gigs at } 4\text{cts. per}$ }
 gig = } 126 00 for gigs.

Amount of toll 383 50 Ans.

- (12) Thus 15gals. in 3min. = 5gals. per min. that run in.
 And $20 \div 5 = 4\text{gals.}$ that run out in a min. Consequently, the gain is $5 - 4 = 1\text{gal.}$ per min. which is 60gals. per hour.
 Then $110 - 60 = 50\text{gals.}$ yet to run in.
 Then 5gals. : 50gals. :: 1min. : 10min. Ans.

(13)

Thus 264

6

mo.

6 $\frac{1}{2}$ 15 84 Int. for 1 year.

3 $\frac{1}{2}$ 7 92
3 96

11 88 Int. for 9 months.

264 00

30 00 profit.

\$305 88 for the whole.

lbs.

\$ cts. m.

Then 28 *cut.* = 3136 30588 (0 9 7+ Ans.

28224

23640

21952

Rem. 1688

(14) Thus, the proportions are A. 4, B. 5, C. 3=12

\$

Then 12 : 780 :: $\left\{ \begin{array}{l} 4 : 260 \text{ A.'s share of profit} \\ 5 : 325 \text{ B.'s do.} \\ 3 : 195 \text{ C.'s do.} \end{array} \right\}$ 1st. Ana.

\$780 proof.

\$ mo.

Then $260 \times 5 = 1300$

$325 \times 7 = 2275$

$195 \times 9 = 1755$

5330

Again 5330 : 5762 :: $\left\{ \begin{array}{l} 1300 : 1405 \text{ 36 A.'s stock.} \\ 2275 : 2459 \text{ 39 B.'s} \\ 1755 : 1897 \text{ 25 C.'s} \end{array} \right.$

\$5762 00 proof.

Now 2459 39
2087 00 B. received.

372 39 B.'s loss of stock.
And 325 00 do. of gain.

Ans. \$697 39 A. & C. would gain.

(15) $100 + 5\frac{1}{2} = 105 \text{ 75}$ \$ cts. m.
Then 105 75 : 100 :: 1000 : 945 62 6 cost C.
20 75 0 less.

\$924 87 6 cost B.

Again 100
— 5 50

94 50 : 100 :: \$924 87 cts. 6m. : \$978 70 cts.
4m. that the whole cost A. which $\div 20 \text{ hhd.} = \$48$
93 cts. 5m. + per hhd. Ans.

(16) $10 \times 11 = 110$ sold for.
 $1 \times 7 = 70$ worth.
\$40 gain of A.

	\$ cts. m.	\$ cts.
And $110 \div 3 =$	36 66 6 + paid cash.	5 25
	110 00 0	4 50
	<u>\$73 33 3 to pay in paper.</u>	<u>\$0 75 B. gains.</u>

Then $450 : 75 :: 73 \text{ 33 3} : \$12 \text{ 22 cts. 2m. gain of B.}$
And $\$40 - \$12.22.2 = \$27 \text{ 77 cts. 8m. more gained by A. Ans.}$

(17) Thus $21-14=7$ years to be of age.

Then \$1300

6

7800 int. for first year.
1300

1278 amount—100.
6

7668 int. second year.
1278

125468 amount—100.
6

752808 int. third year.
125468

12299608 amount—100.
6

73797648 int. fourth year.
12299608

12037584 amount—100.
6

72225504 int. fifth year.
12037584

11759639 amount—100.
6

70559034 int. sixth year.
11759639

11465429 amount—100.
6

68792574 int. seventh year.
11465429

\$1115.33.54^m amount—100. Ans.

Another solution :

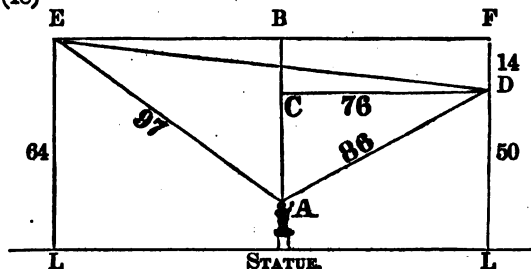
First, $1.06^7 = 1.5036302$. See table II. Arithmetic.

And $1.5036302 \times 1300 = 1954.719$ Amount at Compound Interest.

Also, $8.393637 \times 100 = 839.363$. Amount of \$100 Annuity for 7 years, table III.

Hence $\$1954.719 - \$839.363 = \$1115 \text{ 33cts. 5m. Ans.}$

(18)



Thus, referring to the above figure.

AB is a perpendicular line erected on the centre of the statue's base, which forms the side AC of the right angle ACD; and the other two sides, AD 86 and CD 76, are given to find the length of the side AC.

$$\text{Now } 76^2 = 5776 \text{ \& } 86^2 = 7396$$

$$\underline{\quad 5776 \quad}$$

$$\sqrt{1620 \text{ diff. } (40.2+ = AC}$$

Then $40.2 + 14$ the difference between the columns
 $= 54.2$ the whole length of A B. Then $54.2^2 =$
 2937.64 & $97^2 =$

that is A E = 9409

$- 2937.64$

$\sqrt{6471.36} = 80.44 +$ for E B
 $+ 76$ that is B F

14 = D E

14

56

14

196

156.44 = E B F

156.44

62576

62576

93864

78220

15644

24473.4736

196

$\sqrt[3]{24669.4736} = 157\text{ft. Ans.}$

NOTE.—This solution supposes the statue to be lower than the columns: admitting it to be higher, the operation will, of course, be different; but may readily be performed from the one here given.

(19) 1sec. : 47sec. :: 1150ft. : 54050ft. Ans.

(20) 15m. 7fur. = 83820ft.

Then 1150ft. : 83820ft. :: 1sec. : 1m. 12 $\frac{1}{4}$ sec. Ans.

(21) First suppose $\frac{1}{3}$ of 8.2245 in. to be gold.

$\sqrt{4.11225} = \frac{1}{3}$	4.11225 in. of sil.
10.36	5.85
<hr/>	<hr/>
2467350	2056125
1233675	3289800
411225	2056125
<hr/>	<hr/>
42.602910oz. g.	24.0566625oz. sil.
24.0566625	<hr/>
<hr/>	
66.6595725	
63	
<hr/>	
3.6595725 error of excess.	

Again suppose $\frac{1}{3}$ of 8.2245 in. to be gold, the rest silver.

$\sqrt{2.7415} = \frac{1}{3}$	5.4830=silver.
10.36	5.85
<hr/>	<hr/>
164490	274150
82245	438640
27415	274150
<hr/>	<hr/>
28.401940oz.	32.075550oz. sil.
32.075550	<hr/>
<hr/>	
60.477490	
63.	
<hr/>	
2.522510 error of defect.	

[See following page.]

Then $3.6595725 \times 2.7415 = 10.03271800875$

And $2.522510 \times 4.11225 = 10.37319174750$

And $2.522510 + 3.6595725 = 6.1820825$ 20.40590975625 (3.3009148 inches of gold.
18.5462475

185966225

185462475

503750625

494566600

91840250

61820625

300194250

247283800

529109500

494566600

34542900 rem.

Then $3.3009148 \times 10.36 = 34.106441328$ ounces of gold, and the rest, which is 28.803559672 ounces silver. Ans.

Another solution:

First $\begin{matrix} \text{oz.} & \text{oz.} & \text{oz.} \\ 63 & \div & 8.2245 \end{matrix} = 7.66$ weight of a cubic inch of the mixture.

Then $7.66 \begin{cases} 10.36 \\ 5.85 \end{cases} = \begin{cases} 1.81 \\ 2.7 \end{cases}$ proportional *bulk* of gold.
 proportional *bulk* of silver.

Also $1.81 \times 10.36 = 18.7516$ proportional *weight* of gold.
 And $2.7 \times 5.85 = 15.795$ proportional *weight* of silver.

34.5466 sum.

Hence $\begin{matrix} \text{oz.} \\ 34.5466 : 18.7516 :: 63 : 34.19587 \end{matrix}$ gold } Ans.
 And $\begin{matrix} 34.5466 : 15.795 :: 63 : 28.80356 \end{matrix}$ silver.

Proof 62.99943

(22) Thus 7lbs. beef at $5\frac{1}{2}$ cts. = $40\frac{1}{2}$ cts.

5 bread at 6 = 30

Then $40\frac{1}{2}$ cts. : \$34 50cts. :: 30cts. : \$25 71cts. 4m. +
 Ans.

(23) Thus $\frac{1}{4}$ of $\frac{1}{4}$ of $\frac{383}{463} = \frac{7240}{29189}$.
 Then $1 - \frac{7240}{29189} = \frac{21949}{29189}$ Ans.

(24) $\begin{array}{r} \$ \\ 1000 \\ 6 \\ \hline 60|00 \text{ int. for 1 year.} \\ 8 \\ \hline \$480 \text{ int. for 8 years.} \end{array}$

Then 8 years.
6 per cent.

48
100

148 amt. of \$100 for 8 years. at 6 per cent.

Then \$ 148 : \$ 100 :: \$ 1000 : \$ 675 67 5 the present worth.
1000 00 0

\$324 32 5 discount.
480 00 0 interest.

Ans. \$155 67 5 difference.

(25)

$\sqrt{32}=5.656+$
 $\sqrt{24}=4.9$

10.556 sum.

$\frac{1}{3}/67=4.06+$

Ans. 6.496 difference.

(26) Thus \$100 : \$105 $\frac{1}{4}$:: \$2450 : \$2587 50cts. Ans.

(27) Thus the amount of \$500 75cts. for 9 months at 6 per cent. = \$523 28cts. 4m.

FROMISCIOUS EXAMPLES.

cts. \$ cts.
 And $5064 \times 2\frac{1}{2} = 126\ 60$ price of the boards.
 $140 \times 13 = 18\ 20$ do. tallow.

144 80 amt.
 523 28 4

\$378 48 4 to receive in flax-seed.

Then as $92\frac{1}{2}$ cts. : \$378 48 cts. 4m. :: 1 bu. : $409\frac{1}{2}$ bu.
 Ans.

(26) 9 yrs. = 36 qrs. the sum of terms.

-1

35

3 common difference.

105

+6 = 1st term.

111 last term.

6 = 1st term.

117 sum.

$\times 36$ number of terms.

702

351

2)4212

\$21.06 cts. due him. Ans.

(29) Thus 5yrs.—2yrs.—2yrs.

Then $1.06 \times 1.06 \times 1.045 = 1.174162$ divisor.

And $2363.3875 \div 1.174162 = \2012 82cts. 9m. Ans.

(30) Thus, from January 14th, 1802, till July 5th, 1807, inclusive=5 years 173 days. And the amount of \$1854.69 for that time at 5 per cent. per annum=

\$2362.3161

285. paid off.

2077.3161 second bond.

4 $\frac{1}{2}$

83092644

10386580

5193290

98.67.2514 int. of the 2d bond for 1 yr.

Then $98672514 : 365 :: 52.65 : 194$ days the time of the second bond.

Now 2077.3161

52.65 interest.

2129.9661 amount.

102.43 paid off.

2027.5361 3d bond.

Which was out from January 12, 1808, till October 28th, 1813, which is 5.789 years.

\$2497.0323 last amount.

2027.5361 last bond.

469.4962 gained on the last bond, which was out 5.789 years, and this bond inclusive to the time=11737.4064829.

Then 11737.4064829 : 469.4962 :: 100 : 4 per cent.
Ans.

(31) First suppose 10 horses at $\begin{smallmatrix} \$ \\ 50 \end{smallmatrix} = 500$
 20 cows $\begin{smallmatrix} \$ \\ 20 \end{smallmatrix} = 400$
 60 sheep $\begin{smallmatrix} \$ \\ 4 \end{smallmatrix} = 240$

$\begin{smallmatrix} \$ \\ 1140 \end{smallmatrix}$ sum.
 456

684 error of excess.

Again suppose 8 horses at $\begin{smallmatrix} \$ \\ 50 \end{smallmatrix} = 400$
 16 cows $\begin{smallmatrix} \$ \\ 20 \end{smallmatrix} = 320$
 48 sheep $\begin{smallmatrix} \$ \\ 4 \end{smallmatrix} = 192$

$\begin{smallmatrix} \$ \\ 912 \end{smallmatrix}$ sum.
 456

456 error of excess.

$$\begin{aligned} \bullet \text{ Then } 684 \times 8 &= 5472 \\ 456 \times 10 &= 4560 \end{aligned}$$

$$\begin{array}{r} \text{Difference of errors} = 228 \\ 912 \\ \hline \end{array}$$

$$\begin{array}{rcl} \text{For 4 horses at } \$50 & = & 200 \\ \text{8 cows } 20 & = & 160 \\ \text{24 sheep } 4 & = & 96 \\ \hline & & \$456 \text{ proof.} \end{array} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{Ans.}$$

Another solution :

$$\begin{array}{l} \$ \\ \text{First 50 price of each horse.} \\ 20 \times 2 = 40 \text{ price of cows for each horse.} \\ 4 \times 6 = 24 \text{ price of sheep for each horse.} \\ \hline 114 \end{array}$$

$$\begin{array}{r} 114 \overline{)456} \text{ (4 number of horses.} \\ 456 \\ \hline \end{array}$$

$$\begin{array}{rcl} \text{Then 4 horses at } \$50 & = & 200 \\ 4 \times 2 = 8 \text{ cows } 20 & = & 160 \\ \text{And } 8 \times 3 = 24 \text{ sheep } 4 & = & 96 \\ \hline & & 456 \text{ proof.} \end{array}$$

(32) Thus
Mean rate 19 $\left\{ \begin{array}{l} 16 \\ 17 \\ 24 \end{array} \right\} = \begin{array}{l} 5 \\ 5 \\ 3+2=5 \end{array}$

oz.

oz.

Then as 5 : 10 :: $\left\{ \begin{array}{l} 5 : 10 \text{ of 17 carats fine.} \\ 5 : 10 \text{ of 24 carats fine.} \end{array} \right\}$ Ans.

(33) £100 : £120 :: £230 5s. : £276 6s. the amount in sterling.

Then as £1 : £276 6s. :: \$4 44cts. 4m. : \$1227 87cts. 7m. + Ans.

(34) Thus $\frac{1}{10} + \frac{1}{4} = \frac{11}{20}$, and $\frac{11}{20}$ subtracted from 1 = $\frac{9}{20}$
= the 27 feet.

Then $\frac{1}{20} : 27\text{ft.} :: 1 : 113\text{ft. 4in.}$ Ans.

(35) \$7 - 56\frac{1}{2}\text{cts.} = \$6 43\frac{1}{2}\text{cts. the cost of one yard.}

Then \$6 43\frac{1}{2}\text{cts.} : 56\frac{1}{2}\text{cts.} :: \$400 : \$34 95cts. 1m. Ans.

(36) Thus 80
+ 96
—
126 sum.
25 number of terms.
—
630
252
—
2)3150
—
\$15.75 Ans.

(37) Thus 4 : 9 :: 47 : 105.75 the greater number.
47

152.75 sum.

58.75 difference.

76375

106925

122200

76375

Product 8974.0625 Ans.

THE END.

